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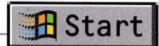
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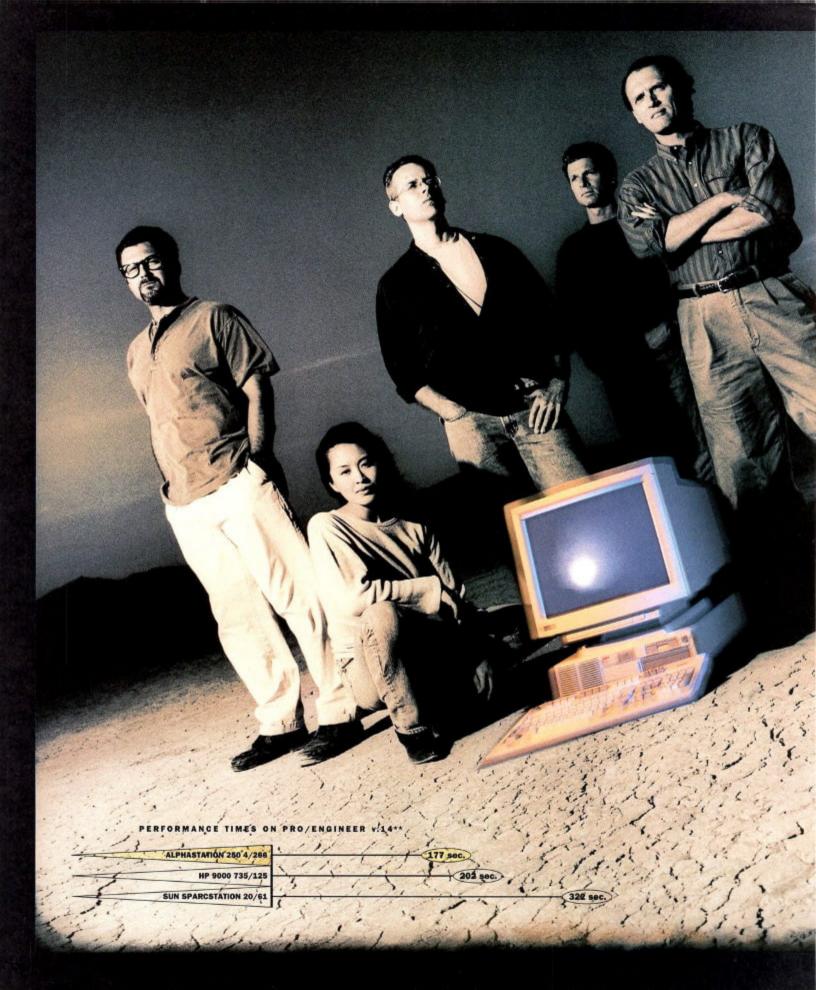
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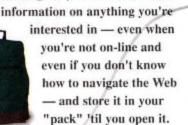












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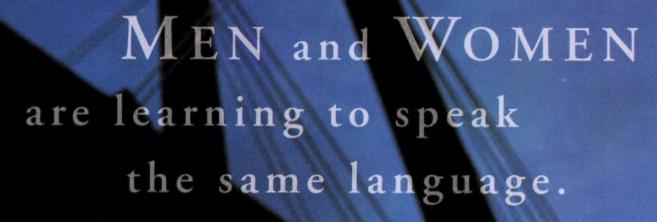




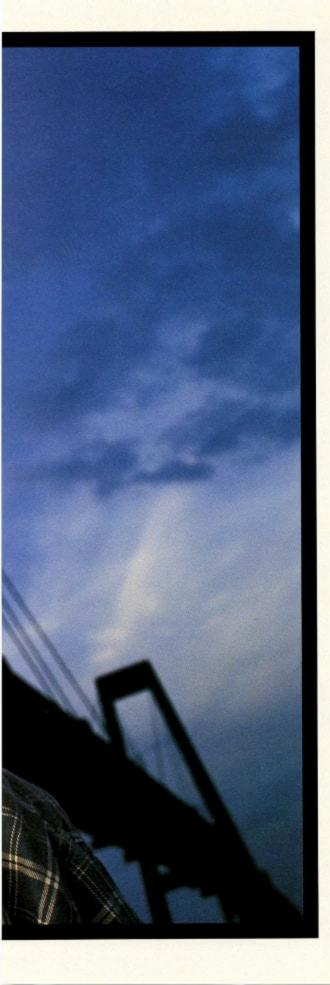












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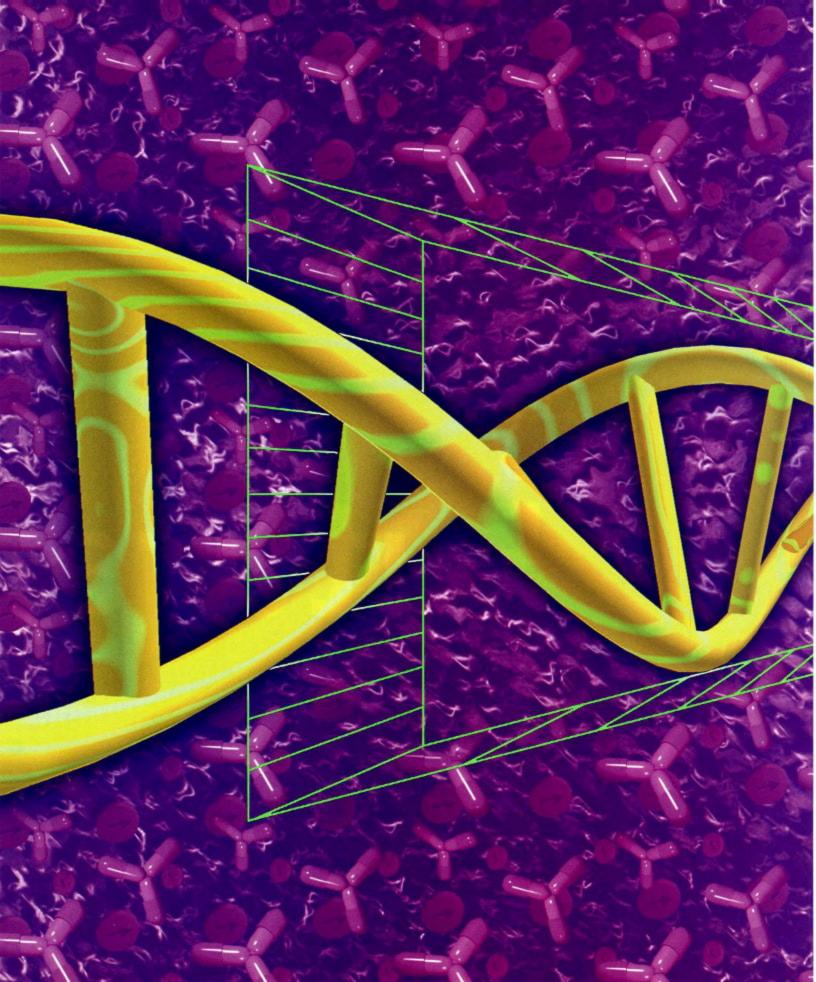
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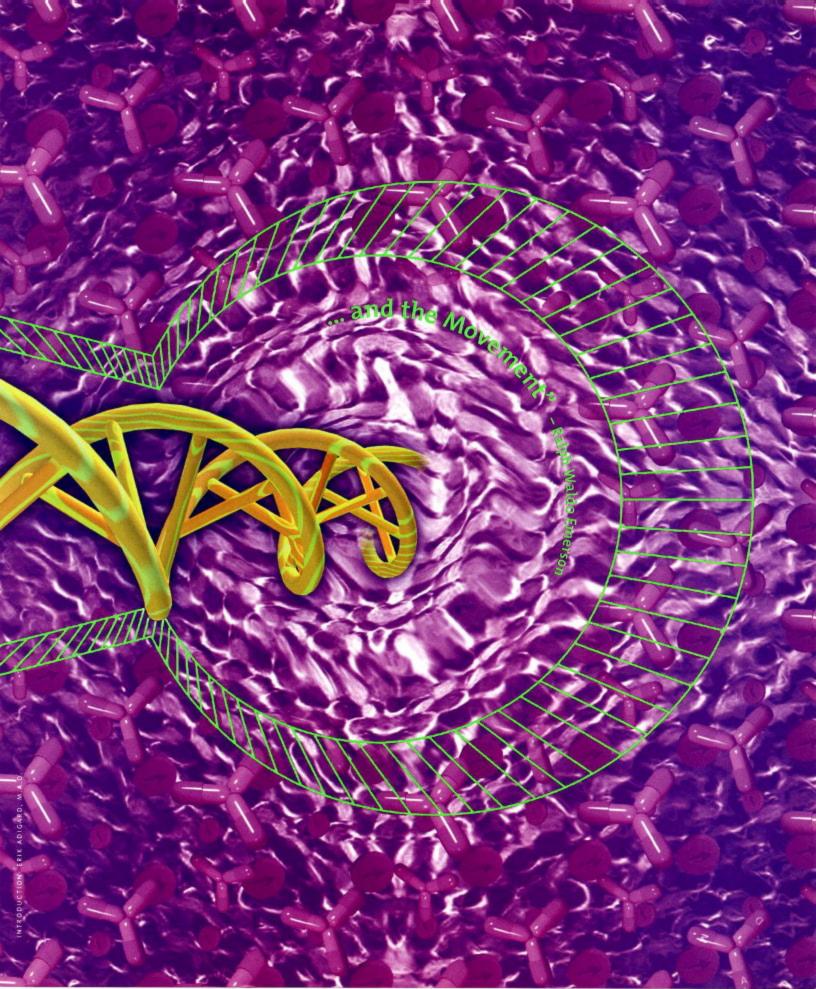


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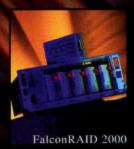
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Questions

By Stewart Brand



What do you think? Are things getting better, or are they getting worse? (Answer three times; the question is worth it. First answers are usually knee-jerk. Second answers tend to be cute. Third answers to the same question sometimes tell the truth.)

"What I really want tolonow is are things getting better, or are they getting worse?"

WIRED SCENARIOS

While you're working through your answers, I'll talk about Herman Kahn and free will. The late, great futurist Kahn (see "I Can See for Miles," page 116) used to ponder the question of free will with his audiences. "It's a fundamental question," he would say. "Do we have free will, or is everything determined? I don't have an answer I'm sure of, but I am convinced that people behave better when they think they have free will. They take responsibility more, and they think about their co-founder of The Well, the Hackers' Conference, and the Global Business Network Util Co

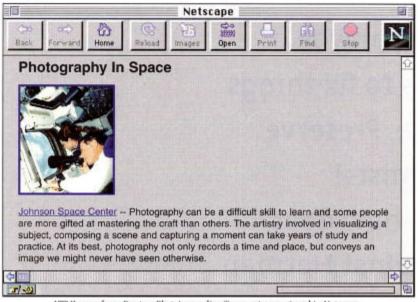
noices more. So I believe in free will."

Most people these days believe things book, The Media Lab, is still in print.

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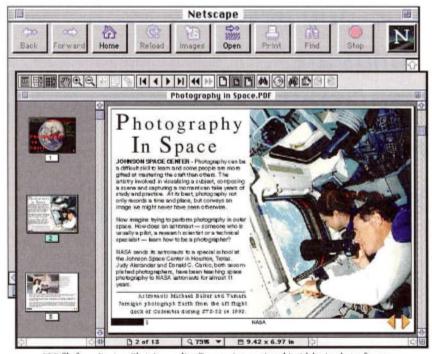
are getting worse. At Global Business Network, we help strategists in large organizations all over the world shape their future. Their view of it is almost always bleak. We also study opinion surveys from around the world. Same thing: people everywhere are worried about the future. (The only two exceptions we've found are businesspeople in Southeast Asia and readers of *Wired*.)

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On the other hand, how does the question play against Herman Kahn's pragmatism test? Do people behave better when they think things are getting better or when they think things are getting worse? If you truly think things are getting worse, won't you grab everything you can while you can? Reap now, sow nothing. But if you think things are getting better, you invest in the future. Sow now, reap later.

There are two kinds of experiences you can have setting up a mobile workforce.

Virtual headache.

Until now, automating a mobile workforce could be a painful experience.

How could you be sure everything would work together?

Or that it would work with what you've already got?

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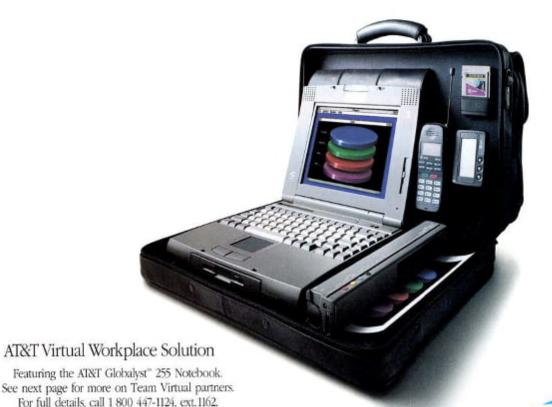








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How you think about the future depends in part on how you think about time.

Laurie Anderson has another question on her album:

time long,

I'd like to know her interpretation of that question. Mine is that time can be thought of in terms of everythinghappening-now-and-last-week-andnext-week (wide) or as a deep, flowing process in which centuries are minor events (long). The wide view sees events as most influenced by what is happening at the moment. The long view perceives events as most influenced by history – "much was decided before you were born." The wide view is disparaged as "short-term thinking."

The long view is praised as responsible.

Wide time is on the increase these days, and for good reason. Technology seems to be accelerating, and you have to keep up. Networks and markets, instead of staid old hierarchies, rule, and you have to keep up. **>**



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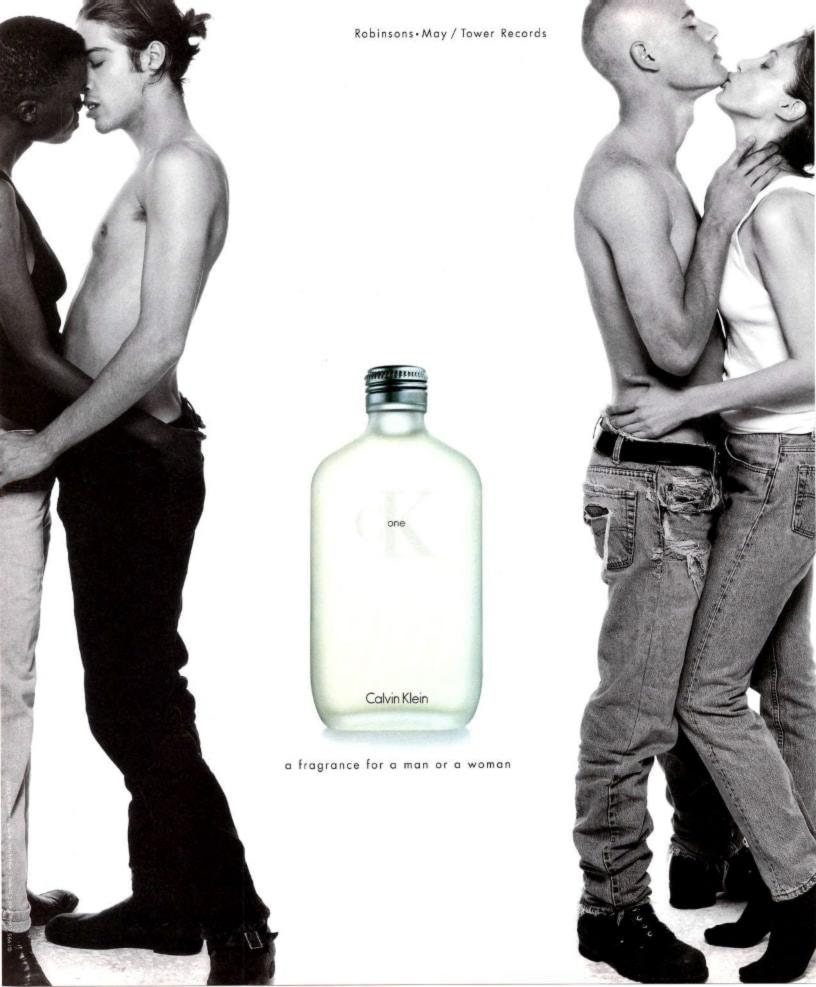


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I-800-557-9614, ext. 91 e-mail: iboxinfo91@spry.com web: http://www.spry.com Wired readers, I warrant, are largely wide-timers. When you look at our sense of the deep past and the deep future, both are faux – medieval fantasies in one direction, space fantasies in the other. We are interested in, for instance, the exponential growth of the World Wide Web. It's useless to try to imagine what the Web might be like in, say, 2045 (as far removed in time as Hiroshima), so we don't bother. Does this mean that technoids and their camp-followers are responsibility-impaired? Could be.

Environmentalists are supposed to be the long-view specialists these days, but I think we do it poorly. I was trained as an ecologist, so I know how extremely limited our "longitudinal studies" are – about the length of time it takes to get a graduate degree. Since it is the long, slow fluctuations and cycles that most influence everything in ecology, we still don't have the most important information on how natural systems actually work over time.







Also, we're calamity callers. We're the leading apostles of Things Are Getting Worse. Gregg Easterbrook has written a whole fat book of environmental good news called A Moment on the Earth, in which he fricassees his fellow environmentalists for scanting their many successes and occasionally lying about their problems (he points out that spotted owls abound in second-growth forests, for example). Some years back, pioneer environmentalist René Dubos who coined the phrase "Think globally, act locally" - wrote a paean to the places where humans and natural systems blend beautifully. It was titled The Wooing of the Earth. It is long out of print.

Dubos and Easterbrook have the responsible approach. Things are getting better. Sow now, reap later.

Hey, wait a second, weren't we supposed to be out of business by now

A few years ago,
if you'd gone around
and asked people
what does this
country need most

right now, the last thing anyone would have said was, gee, we sure could use another car company. 2 And

yet, that's exactly what we at Saturn set out to create. Although we all knew this would be anything but another car company, the hard part would be convincing everyone else.

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which, when you think about it, isn't just about building a good car. There are lots of good cars out there.

It's not just about creating a successful business, either.

That's done all the time. The Saturn difference really lies in the ability to do things other companies only dreamed of. Things like changing the way labor and

management interact, or the way a customer is treated when she walks into a showroom. Small things really; seemingly insignificant. Until you add them all up. Ξ Which is exactly what Saturn owner Kenneth Marzik did.

His conclusion:

Now, six years later, with over a million Saturns out on the road, it would appear as though we've been pretty convincing. Bolstered by this fact, we figured it would



be okay with everyone if we went ahead and built the next generation of Saturns. So that "If more companies were like Saturn, this country would be in a heckuva lot better shape."

Guess we are not lacking in the enthusiasm department, huh?



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As for Laurie Anderson, in recent concerts she told of interviewing avant-garde composer John Cage when he was 80 - "an age when most people are in a bad mood." She put the better-orworse question to him. Cage hedged cheerfully for a while and then admitted he thought things are getting better slowwwly. That's just right. • • •



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millennium clock By Danny Hillis

When I was a kid three decades ago, the future was a long way off – at the turn of the millennium. Dates like 1984 and 2001 were comfortably remote. But the funny thing is that in all these years, the future that people think about has not moved past the millennium. It's as if the future has been shrinking one year, per year, for my entire life. 2005 is still too far away to plan for and 2030 is too far away to even think about. Why bother making plans when everything will change?



How we name our years is part of the problem. Those three zeros in the millennium form a convenient barrier, a reassuring boundary by which we can hold on to the present and isolate ourselves from whatever comes next. Still, there is more to this shortening of the future than dates. It feels like something big is about to happen: graphs show us the yearly growth of populations, atmospheric concentrations of carbon dioxide, Net addresses, and Mbytes per dollar. They all soar up to an asymptote just beyond the turn of the century: The Singularity. The end of everything we know. The beginning of something we may never understand.

Danny Hillis is an inventor, scientist, and computer designer. He pioneered the concept of massively parallel computers that is now the basis of most new supercomputer designs. Hillis is currently researching the creation of software by a process analogous to biological evolution.

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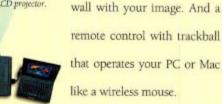
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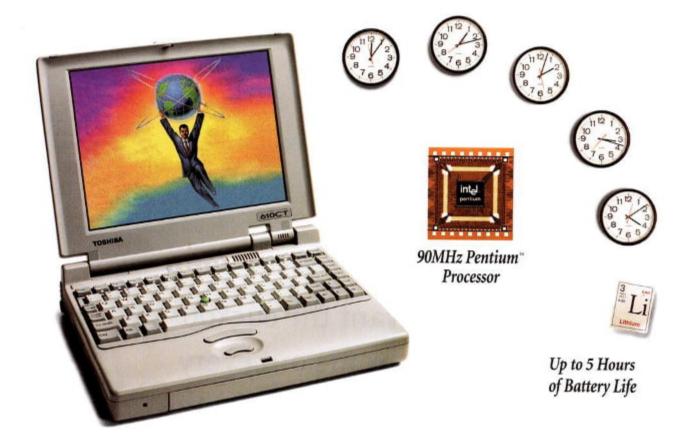
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I think of the oak beams

in the ceiling of College Hall at New College, Oxford. Last century, when the beams needed replacing, carpenters used oak trees that had been planted in 1386 when the dining hall was first built. The 14thcentury builder had planted the trees in anticipation of the time, hundreds of years in the future, when the beams would need replacing. Did the carpenters plant new trees to replace the beams again a few hundred years from now? ▶

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When I tell my friends about the millennium clock, either they get it or they don't. Most of them assume I'm not serious, or if I am, I must be having a midlife crisis. "That's nice, Danny, but why can't you just write a computer program to do the same thing?" Or "Maybe you should start another company instead." My friends who get it all have ideas that focus on a particular aspect of the clock. My engineering friends worry about the power source: solar, water, nuclear, geothermal, diffusion, or tidal? My entrepreneurial friends muse about how to make it financially self-sustaining. My writer friend, Stewart Brand, starts thinking about the organization that will take care of the clock. It's a Rorschach test – of time. Peter Gabriel, the musician, thinks the clock should be alive, like a garden, counting the seasons with short-lived flowers, counting the years with sequoias and bristlecone pines. Artist Brian Eno felt it should have a name, so he gave it one: The Clock of the Long Now. ▶



Ten thousand years – the life span I hope for the clock – is about as long as the history of human technology. We have fragments of pots that old. Geologically, it's a blink of an eye. When you start thinking about building something that lasts that long, the real problem is not decay and corrosion, or even the power source. The real problem is people. If something becomes unimportant to people, it gets scrapped for parts; if it becomes important, it turns into a symbol and must eventually be destroyed. The only way to survive over the long run is to be made of materials large and worthless, like Stonehenge and the Pyramids, or to become lost. The Dead Sea Scrolls managed to survive by remaining unfound for a couple millennia. Now that they've been located and preserved in a museum, they're probably doomed. I give them two centuries – tops. ▶

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WHO THE HELL WANTS TO HEAR ACTORS TALK?

HARRY M. WARNER,
FOUNDER, WARNER BROS. STUDIO (1927)

RAIL TRAVEL AT HIGH SPEEDS IS NOT POSSIBLE
BECAUSE PASSENGERS, UNABLE TO BREATHE,
WOULD DIE OF ASPHYXIA.

DIONYSIUS LARDNER, ENGLISH SCIENTIST (1793-1859)

WHILE THEORETICALLY AND TECHNICALLY TELEVISION
MAY BE FEASIBLE, COMMERCIALLY AND FINANCIALLY
I CONSIDER IT AN IMPOSSIBILITY. . .

LEE DEFOREST, AMERICAN INVENTOR (1873-1961)

The only limitations are those of imagination

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Now two leading independent labs, TeleQuality Associates and Henderson Communications Laboratories, report the same conclusion: in three critical measurements – Compatibility, Connect Success Rate and Throughput – the U.S. Robotics Sportster simply blew away the rest of the field.

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How does U.S. Robotics' Sportster® stack up against other leading V.34 28.8 modems?



OFF THE SHELF, OUT OF TWO INDEPENDENT LABS PUT

THE THREE CRITICAL TEST PARAMETERS:

COMPATIBILITY

ARE ALL V.34 28.8 MODEMS CREATED EQUAL?

That was the question tackled by two independent testing labs — TeleQuality Associates of Golden, Colorado, and Henderson Communications Laboratories, Inc. of Moreno Valley, California.

While each testing facility used a different methodology and tested different units, both set out to rate the performance of the popular, best-selling external V.34 modems. Compatibility, connect rates, and how often maximum speeds were reached and maintained, were documented. The labs analyzed how effectively each manufacturer engineered its V.34 modems, and how well each one realized the potential of this new technology under real-world conditions.

All units were comparably equipped and the latest version available. To eliminate any bias that might occur when testing between like modems, i.e. Sportster to Sportster, all tests by both labs employed a full compatibility test matrix: every modem was tested with every modem. In order to do well, each modem would have to successfully handle the quirks of all the others in both answer and originate modes.

First, an overview of TeleQuality's procedures:

The connect success rate tests were made with low, medium and high signal levels and incrementally varied noise from low to high. These tests were repeated over both a good (flat attenuation) and a bad (high rolloff 3002) phone line. All modems were pushed to their functional limits with 15 call cycles performed at each signal-to-noise (SNR) point. The percentage of successful connections for each SNR point was measured and graphed for all combinations of modems.

The performance tests were completed with the same types of phone lines, under the same SNR conditions using a highly compressible file transferred in both directions simultaneously. Again, the speed of the error-free data transfer was measured and graphed for all phone line and SNR points on all combinations of modems.

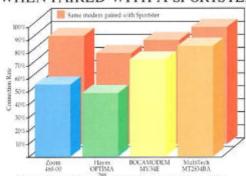
What follows on these two pages is a closer look at the results of the TeleQuality testing. On the back page are highlights of the Henderson test results. In both tests the bottom line says the same thing: buy a Sportster.

SPORTSTER OUTPERFORMS THE PACK IN COMPATIBILITY.

In order for modems to interact successfully, and at maximum speeds, each must be capable of assessing and compensating for differences between itself and its counterpart. The ideal modem is sensitive, tolerant and reactive. It identifies connection characteristics and makes the necessary adjustments in order to wring out maximum throughput — regardless of the operational idiosyncrasies of the modem on the other end of the line.

Given the common configuration of two same-brand modems, the ultimate compatibility would be expected when modem "A" is dialed into another modem "A". This study found that was not necessarily the case. In fact, some modems performed better when paired with a more robust competitive modem than when paired with themselves.

PERFORMANCE IMPROVEMENT WHEN PAIRED WITH A SPORTSTER



Connection rate improvement of modems paired with a Sportster compared to modems paired with themselves.

The study revealed that some modems had difficulty connecting to others at optimum speeds. In fact, certain modems showed substandard performance even when connected to themselves.

U. S. Robotics' Sportster displayed the most consistent compatibility with all other modems in the test. Interestingly, other modems in the study performed better when connected with the Sportster than when connected to themselves.

THE BOX, AND ON-LINE THE TOP BRANDS TO THE TEST.

CONNECTIVITY

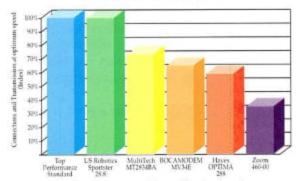
THROUGHPUT

SPORTSTER SUPERIOR IN CONNECTING AT OPTIMUM SPEEDS.

Because connection success rates can be enhanced at the expense of speed, the lab defined and measured connectivity as a function of connection success and error-free throughput. This measure yields a performance profile more indicative of true user satisfaction — where connecting at optimum speeds with other modems is preferable to connecting at slower data rates.

Connection success rates and throughput scores were combined and normalized to establish a top performance standard (100) in order to show the relative connectivity scores of each modem.

COMPATIBILITY WITH OTHER MODEMS AT OPTIMUM SPEED



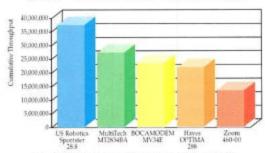
Each modem was tested for send/receive throughput in paired combination with every other modem including itself.

These results showed a great variability in the connectivity of the modems studied. The U. S. Robotics Sportster outperformed all other modems in the test by demonstrating its ability to consistently connect at optimum speeds. Differences were quite dramatic with scores for other modems in the study falling from 18% to 64% below that of the Sportster.

SPORTSTER SETS STANDARDS IN THROUGHPUT.

Throughput refers to the maximum amount of data a given modem can transmit over the widest variety of line conditions. Given perfect circumstances, any modem can reach its top speeds and maximum throughput. But end-users do not have the luxury of controlling conditions. Many variables can effect line quality, from geography to simple random channel assignment upon dial-in. Whatever hurdles may be present to impair maximum throughput, better modems sense them and initiate countermeasures to insure peak performance over the widest variety of line conditions.

CUMULATIVE THROUGHPUT OVER VARIED LINE CONDITIONS



Each modem was tested for send/receive throughput in paired combination with every other modem including itself,

The study found that some modems performed significantly better than others in this regard. The top performing modems effectively dealt with connection variables and line noise levels to deliver higher maximum throughput. In this test, U. S. Robotics' Sportster delivered the most data over the widest variety of line conditions — up to 177% better than other modems.

THE FIRST TEST WAS NO FLUKE!

Henderson Communications Laboratories also conducted tests with the leading modems on the

market to measure each one's ability to connect and transmit data without error.

66 In this study, connect rate performance was measured while attempting 119 connections over a range of test loop combinations as established in the Telecommunications Industry Association TSB-38 and TSB-37A Table 2 standard. A success was recorded each time a connection was

established and a short message was transmitted error-free.

The results clearly indicate U. S. Robotics'
Sportster's superiority with a 100% connection rate
— outperforming the other modems in the study by
as much as 36%.

Another performance measure was throughput. In this phase, each modem's ability to perform in typical

asynchronous applications was rated based on its ability to transmit data over a variety of telephone network conditions. A TAS 1200 simulator was used on a select group of test channels, as outlined in TSB-37A Tables 3 through 6, to represent 95% of all possible telephone line types.

The research confirms the performance leadership of U. S. Robotics' Sportster V.34. Combining its 16% cumulative

throughput advantage over the next best modem with a connect success rate up to 41% better than others tested, Sportster clearly provides superior overall performance. ??

Henderson Communications Laboratories



Successful connections to same-brand moderns in 119 trials

CONCLUSIONS & RECOMMENDATIONS

66 The V.34 standard offers tremendous promise for enabling new and more powerful applications. However, the V.34 standard carries with it challenging

technological demands for modem manufacturers. How well each manufacturer addresses these challenges will ultimately shape the end-user's experience with V.34.

Based on data obtained in this study, it's clear that some modem makers have embraced and managed the complexities of V.34 technology significantly better than others.

The U. S. Robotics Sportster proved that across all modems studied, it consistently delivered on the promises of V.34 — increased compatibility, connect rate and throughput.

Sportster clearly demonstrated its superiority. It is intuitively designed, robustly engineered and flawlessly manufactured. ??

TeleQuality Associates



FOR MORE INFORMATION* ABOUT THE SPORTSTER V.34 AND THESE INDEPENDENT RESEARCH FINDINGS, PLEASE CALL 1-800-DIAL-USR













The fate of really old things leads me to think that the clock should be copied and hidden. The idea of hiding the clock to preserve it has a natural corollary, but it takes Teller, the professional magician, to suggest it without shame: "The important thing is to make a very convincing documentary about building the clock and hiding it. Don't actually build one. That would spoil the myth if it was ever found." In a way, Teller is right. The only clocks that have ever really survived over the long run (like the water clock of Su Sung, or the giant hourglass of Uqbar) have survived in books, drawings, and stories. In the universe, pure information lives the longest. Bits last. ▶

Architecture



THE STATE OF

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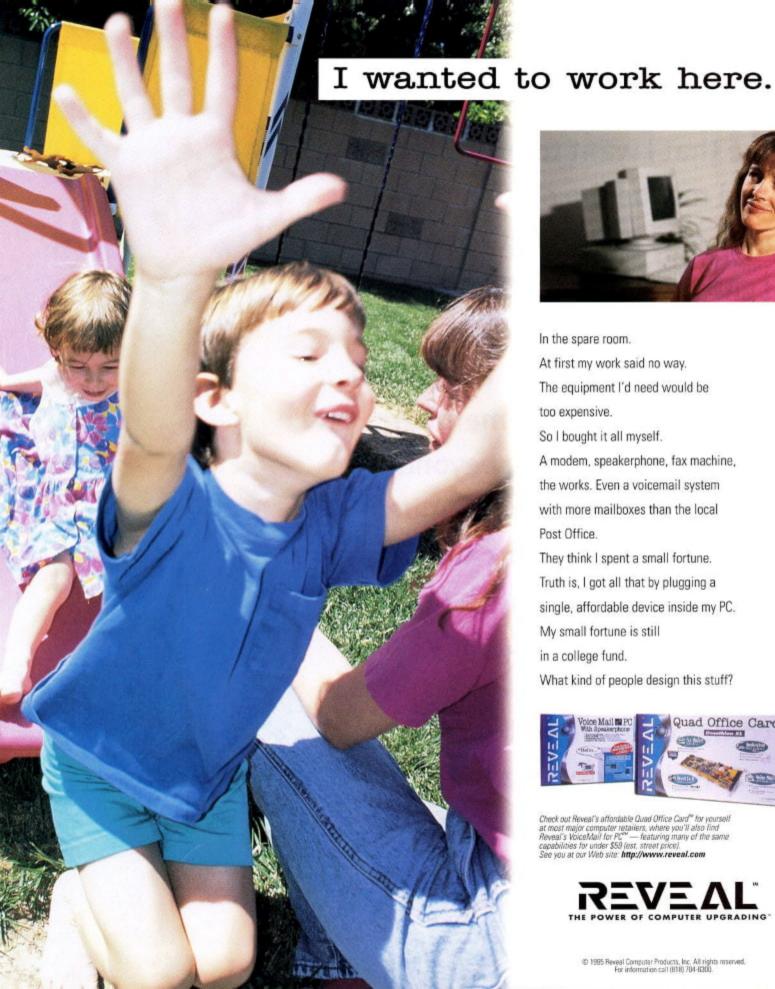


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ust before Jonas Salk died, I was lucky enough to sit next to him at a dinner. I didn't know him well, but in past conversations he had always encouraged my more mystical lines of thought. I was sure he would like the millennium clock. I was disappointed by his response: "Think about what problem you are trying to solve. What question are you really trying to ask?" I had never thought of the clock as a question. It was more of an answer, although I wasn't sure to what. I talked more, about the shrinking future, about the oak trees. "Oh, I see," Salk said. "You want to preserve something of yourself, just as I am preserving something of myself by having this conversation with you." I remembered this a few weeks later, when he died. "Be sure you think carefully about exactly what you want to preserve," he said. ▶





In the spare room.

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OK Jonas, OK people of the future, here is a part of me that I want to preserve, and maybe the clock is my way of explaining it to you: I cannot imagine the future, but I care about it. I know I am a part of a story that starts long before I can remember and continues long beyond when anyone will remember me. I sense that I am alive at a time of important change, and I feel a responsibility to make sure that the change comes out well. I plant my acorns knowing that I will never live to harvest the oaks. I have hope for the future.

Silicon Graphics

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unfortunately.

that's

exactly

what

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"Once users begin carrying the Envoy or Marco, I doubt they'll ever want to leave them at home."

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*Envoy and Marco communicators come bundled with RadioMail® and ARDIS™ PersonalMessaging services software. Both devices operate on the ARDIS™ nationwide wireless data network, which covers over 90% of all U.S. Discusses activity.

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The Future *he Future

How to Build Scenarios

Planning for "long fuse, big bang" problems in an era of uncertainty.

By Lawrence Wilkinson

Illustrations by Lou Beach

It happens to us all. We look out into the future, trying our best to make wise decisions, only to find ourselves staring into the teeth of ferocious and widespread uncertainties. If only everything didn't depend on, well, everything else. How do we decide what kind of career path to pursue when it's not clear what industries will exist in 10 or 15 years? How do we plan our children's education when we can't know what sort of society they'll live in? As we face each of these problems, we confront a deeper dilemma: how do we strike a balance between prediction – believing that we can see past these uncertainties when in fact we can't – and paralysis – letting the uncertainties freeze us into inactivity.

The senior managers of large corporations face a similar dilemma, but they often carry the additional weight that on their decisions rest the livelihoods of thousands. The cliché is that it's lonely at the top. But for most managers these days, the bigger problem is that it's confusing up there. It's no longer enough simply to execute, to "do things right." Like us, senior executives have to choose the right thing to do: set a course, steer through the strategic issues that cloud their companies' horizons. Do we or don't we buy that competitor? Build that semiconductor fab plant? Replace the copper in our network with fiber? Or wait and save billions?

Questions like these are known as "long fuse, big bang" problems. Whatever you decide to do will play out with a big bang – often a life or death difference to an organization – but it can take years to learn whether your decision was wise or not. Worse yet, "long fuse, big bang" questions don't lend themselves to traditional analysis; it's simply impossible to research away the uncertainties on which the success of a key decision will hang.

Still, like us, the manager must make a decision – and make it now. The rest of the stampeding world will not wait until certainty appears. Anything that can help make a decision in the midst of uncertainty will be valuable. One such tool is scenario planning. A growing number of corporate executives are using scenario planning to make big, hard decisions more effectively. And it's not just for bigwigs: scenario planning can help us at a personal level as well.

Scenario planning derives from the observation that, given the impossibility of knowing precisely how the future will play out, a good decision or strategy to adopt is one that plays out well across several possible futures. To find that "robust" strategy, scenarios are created in plural, such that each scenario diverges markedly from the others. These sets of scenarios are, essentially, specially constructed stories about the future, each one modeling a distinct, plausible world in which we might someday have to live and work.

Yet, the purpose of scenario planning is not to pinpoint future events but to highlight large-scale forces that push the future in different directions. It's about making these forces visible, so that if they do happen, the planner will at least recognize them. It's about helping make better decisions today.

Scenario 1: | Will

The world fragments into a working pandemonium of individuals, organized by jobs rather than geography. Communication is pervasive and focuses on personal empowerment. The Net becomes the chief exchange medium for decentralized work, personal gratification, and global commerce. Physical infrastructure in North America stagnates, while personal spaces thrive. Art and attention are turned inward, as personal expression flourishes in new media and old public spaces crumble. Technology is the global culture. The have-nots become the have-lates. Ethnic or group differences give way to a homogenized patchwork of unbridled individual variety. Europe is wracked with civil strife as its socialistic civilization unravels. Russia rebounds. Japan lags. China and the developing countries become huge flea markets where just about anything goes.





There are an infinite number of stories about the future; our purpose is to tell those that matter.

Scenario 2: Consumerland

The world is populated by consumers rather than citizens. Technology breeds unlimited customized choices. The consumer is served by highly evolved companies, aggressively nimble and conscientious of the market's whims. Computers do increasing amounts of white-collar work. Manufactured products are heavily personalized, but do-it-yourself dies. Real leisure increases: dissent withers. Politics means electronic voting, Governments are virtual corporations, with their heavy lifting privatized to commercial ventures. The havenots are given spending youchers. Southeast Asia and the coast of China manufacture most of Consumerland's goods. and consume almost half themselves. Latin America is their branch office. Japan gets richer and unhappier. Russia exports trouble in the form of neoreligious cultists and mafioso. The US and Europe become large theme parks.

Lawrence Wilkinson (wilkinson@gbn.org) is co-founder and managing director of Global Business Network, a think tank and strategic consultancy that has pioneered the use of scenario planning (see Wired 2.11, page 98); he is also chief architect of Wired Ventures Ltd. This all sounds rather esoteric, but as my partner Peter Schwartz (see "The New World Disorder," page 104) is fond of saying, "scenario making isn't rocket science." He should know. Not only did he help develop the technique back in the 1970s, but he's also a rocket scientist.

Scenario planning begins by identifying the focal issue or decision. There are an infinite number of stories that we could tell about the future; our purpose is to tell those that matter, that lead to better decisions. So we begin the process by agreeing on the issue that we want to address. Sometimes the question is rather broad (What's the future of the former Soviet Union?); sometimes, it's pretty specific (Should we introduce a new operating system?). Either way, the point is to agree on the issue(s) that will be used as a test of relevance as we go through the rest of the scenario-making process.

As managers of our own lives, we can do the same exercise. Let's say that our key concern is the quality of life that we'll have in 15 or 20 years and the personal investments that we'll need to make in preparation for the future.

We breathe in: driving forces

Since scenarios are a way of understanding the dynamics shaping the future, we next attempt to identify the primary "driving forces" at work in the present. These fall roughly into four categories:

- Social dynamics quantitative, demographic issues (How influential will youth be in 10 years?); softer issues of values, lifestyle, demand, or political energy (Will people get bored with online chatting?).
- Economic issues macroeconomic trends and forces shaping the economy as a whole (How will international trade flow and exchange rates affect the price of chips?); microeconomic dynamics (What might my competitors do? How might the very structure of the industry change?); and forces at work, on or within the company itself (Will we be able to find

the skilled employees we need?).

- Political issues electoral (Who'll be the next president or premier?); legislative (Will tax policies be changed?); regulatory (Will the FCC loosen its grip on radio spectrum?); and litigative (Will the courts break up Microsoft?).
- Technological issues direct (How will highbandwidth wireless affect land-line telephony?); enabling (Will X-ray lithography bring in the next chip revolution?); and indirect (Will biotech allow easy "body hacking" and thus compete with more traditional forms of entertainment?)

Of course, categories are only handles. Real issues entail a bit of all four forces. The point of listing the driving forces is to look past the everyday crises that typically occupy our minds and to examine the long-term forces that ordinarily work well outside our concerns. It is these powerful forces that will usually catch us unaware.

Once these forces are enumerated, we can see that from our own viewpoint, some forces can be called "predetermined" – not in a philosophical sense, but in that they are completely outside our control and will play out in any story we tell about the future. For instance, the number of high school students in California 10 years from now is more or less predetermined by the number of elementary school children now. Not all forces are so evident, or so easy to calculate, but when we build our stories, predetermined elements figure in each one.

Scenario logics

After we identify the predetermined elements from the list of driving forces, we should be left with a number of uncertainties. We then sort these to make sure they are *critical* uncertainties. A critical uncertainty is an uncertainty that is key to our focal issue. For instance, will the percentage of women in the work force continue to increase? Our goals are twofold – we want better to understand all of the



In scenario making, we can create a matrix (two axes crossing) that defines four very different, but plausible futures. For instance, if the future is one characterized by communitarian desires but decentralized social structures, we get Ecotopia.

uncertain forces and their relationships with each other. But at the same time, we want the few that we believe are both most important to the focal issue and most impossible to predict to float up to the surface.

At first, all uncertainties seem unique. But by stepping back, we can reduce bundles of uncertainties that have some commonality to a single spectrum, an axis of uncertainty. If we can simplify our entire list of related uncertainties into two orthogonal axes, then we can define a matrix (two axes crossing) that allows us to define four very different, but plausible, quadrants of uncertainty. Each of these far corners is, in essence, a logical future that we can explore.

(We could, of course, spin hundreds of scenarios from combinations of our forces, but experience teaches that fewer are better. The right one, two, or three axes give us a very effective framework in which to explore all of the other forces.)

Wired staff developed, as an illustration, the following matrix as one set of scenarios for the future. The question: what will be the general tenor of commercial life on a global scale in the year 2020?

The first axis of uncertainty is the character of our desire, an "I" or "We," individual or community.

This uncertainty about the quality of our individual hopes and intentions cuts at the most fundamental level: Will the energy of democratization and the ascendance of the ultimate individualized "I" continue to prevail? Or will our social organization and self-definition be rooted in a group – a nation, a tribe, a collection of users of a particular brand, a more communitarian "We"? The I or the We will never disappear, but which will come to be the prevailing influence in our culture? It could go either way, and with a bang; that is the uncertainty.

The second (vertical) axis shows the uncertain character of social structure: Will society be a center that holds and provides stability, or will it fragment? Here, we stake out the extreme possibilities of social organization: Will social and political structures (either new or traditional) provide a society-wide coherence and order? Or will society shatter into shards, the jagged edges of which do not mesh into a coherent whole? Will there be a state to impose order, level the playing field, and unify a commonwealth? Or, will permanent fragmentation, increasing plurality, and unfettered free-marketism bring us to "bottom-up" functioning anarchy?

Our second uncertainty might seem at first blush an outcome of the first. But in fact, while they're related, they're separately uncertain. Indeed, it's precisely the way they're intertwined that makes them interesting by giving us four scenarios, four very different "future spaces" to explore.

Fleshing out the scenarios

We return to the list of driving forces that we generated earlier; these dynamics become "characters" in the stories that we develop. Our goal is not to try to tell four stories, one of which – we hope, as futurists – will be true. Instead, we recognize that the "real" future will not be any of the four scenarios, but that it will contain elements of all of our scenarios. Our goal is to pin down the corners of the plausible futures. These corners are exaggerated – the outer limits of what is plausible. Thus, our scenarios will have a near-caricature quality.

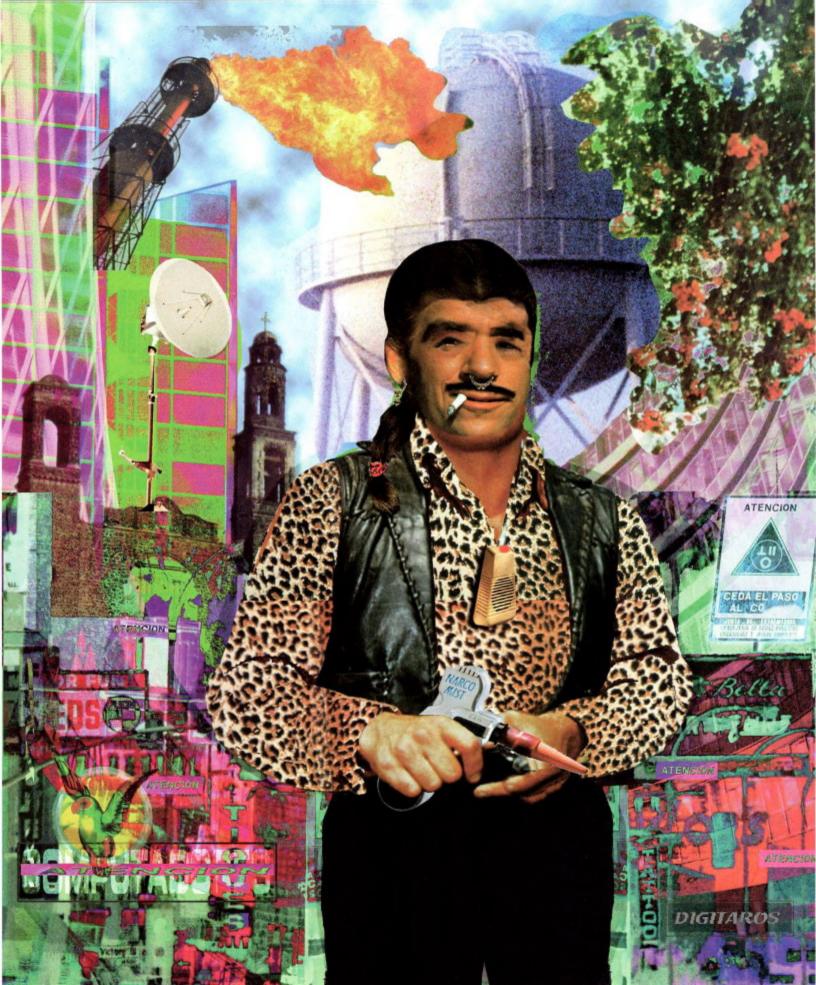
Here's how the Wired scenarios play out in each of the four corners:

I Will is the quadrant where individualism (I-ness) meets fragmentary or marginal control by large organizations. It is a future in which you want and get the ability to make your life uniquely yours. The Net is the ubiquitous medium through which you realize your desires and discharge your few and relatively unimportant social duties. Government has withered in the face of privatization, replaced by a largely electronic marketplace that connects and

Scenario 3: Ecotopia

The world slows the growth of development. In reaction to earlier decades of high crime and chaos, communitarian values triumph over strictly individualistic ones. Slimmeddown and digitized governments win the trust of people. Directed taxation funds public works, some of them largescale. Corporations adopt civicresponsibility programs out of long-term economic self-interest. Technology, such as online shopping, makes urban living very resource-friendly. Net access is a subsidized right. Dirty technologies are outlawed, forcing less-developed countries to leapfrog to clean and light technologies, if they can. Initially, this widens the gap between rich and poor nations. Europe erupts into a second renaissance, becoming a moral beacon. Japan mobilizes not much later. The Islamic world awakens. Asia and Latin America become lifeboats for the young and restless of the developed world who find the environmentalism and communitarianism too dogmatic: they settle in "free economic zones," where their migration and energy help to vitalize growth. North America stumbles as its cowboy individualism is tamed.





Scenario 4: New Civics

The world settles into small. powerful city-states. Rural areas of the world are secondclass, but have widespread virtual hookups. Europe fractionalizes into 57 countries: China, Russia, Brazil, and India also devolve into black market ethnic states. Gangs in developing countries and old inner cities transform into political law-and-order machines. Citizens use networks and databases to watch over and protect each other. Average life spans increase dramatically; general health improves. Civic pride blossoms. Governments use advance technologies to create the largest public works yet, both citywide and global. Corporations are reigned in by civic regulations, although they increase in size - there's the Fortune Global 5,000. Conglomerates fund most of the UN-type activities.

Like real life, scenarios are mixed bags, at once wonderfully dreadful and dreadfully wonderful.

clears transactions of every type. Most large, centralized institutions have crumbled into a much more finely grained pattern, a many-to-many landscape on which each individual is alternately producer and user. In this future, you co-produce the products and experiences that you consume. Your loyalty is to your tools, knowledge, and skills.

Consumerland is the quadrant where individual desires meet a social and corporate center. It is a future in which everyone is the ultimate consumer, possessed of almost infinite choices. The Net is again a ubiquitous medium – but a medium through which corporations deliver marketing messages tailored directly to your unique preferences, via personal catalogs, personalized ads and coupons, and the like. The products, of course, are "mass customized" to your desires. Government plays an active role, laying down the rules (standards, regulations) by which corporations play. Social organizations proliferate but it is clear that they serve individual yearnings. The citizen becomes a consumer – served by society.

Ecotopia is the quadrant where a communal sense of "We" meets a strong social center. It is the future where the center holds. Government plays a large role in supporting the commonwealth, but more important than government is the emergence of widely shared ecological values. These are not coercive values but a voluntary embrace of cohesion, cooperation, and reduced consumption, backed by legislation and even corporate policies. The Net acts as replacement technology; it's maximized to eliminate the need to travel on business, to cut down on the amount of paper used, etc.

New Civics is a future in which values are shared but in many small, competing groups. It is a decentralized world of tribes, clans, "families," networks, and gangs. It is a future in which we want to build and enjoy the benefits of community but without the help of a benevolent Big Brother government. The Net encourages each group to move most of its members' economic activity and their social services inside a closed group. Thus, government's role and influence are eclipsed by the sway of these emergent groups; small – often deadly – conflicts among groups pop up continually around the globe. Our primary concern is to be good members of our group. Our loyalty is to its membership, its mores, and its brands. While this future conjures visions of organized crime and sectarian strife, it is also a future of pride, heroism, and the satisfactions of belonging.

Note that the scenarios don't fall neatly into "good" and "bad" worlds, desirable and undesirable futures. Like the real life from which they're built, the scenarios are mixed bags, at once wonderfully dreadful and dreadfully wonderful.

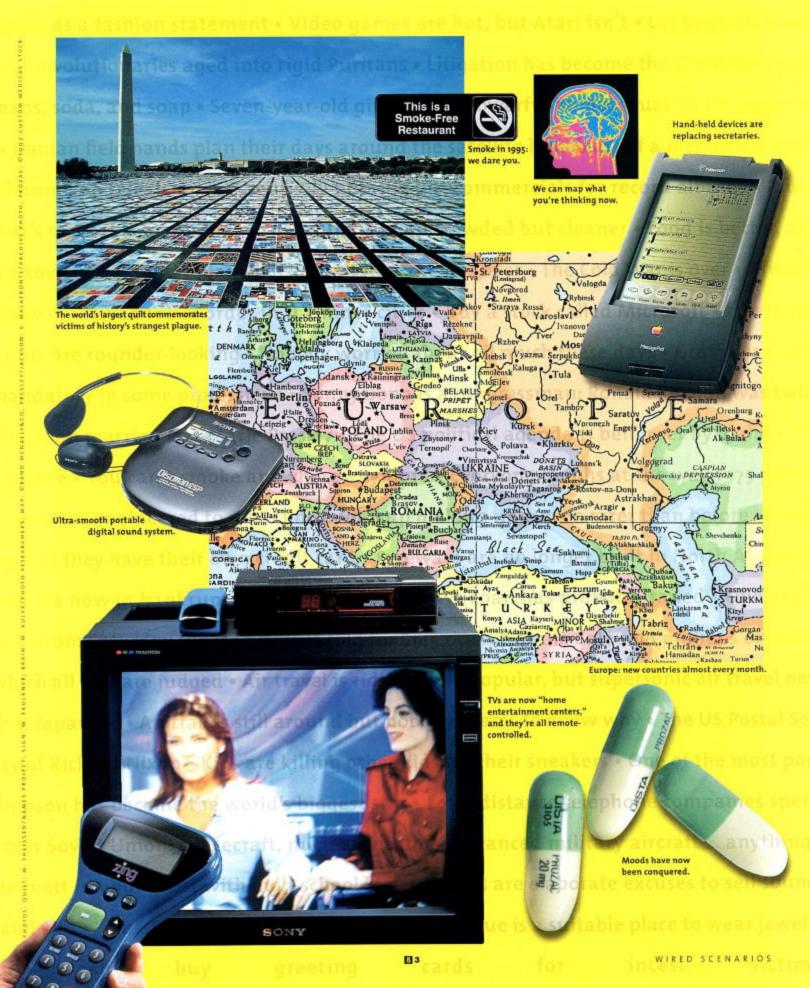
The implications of our scenarios

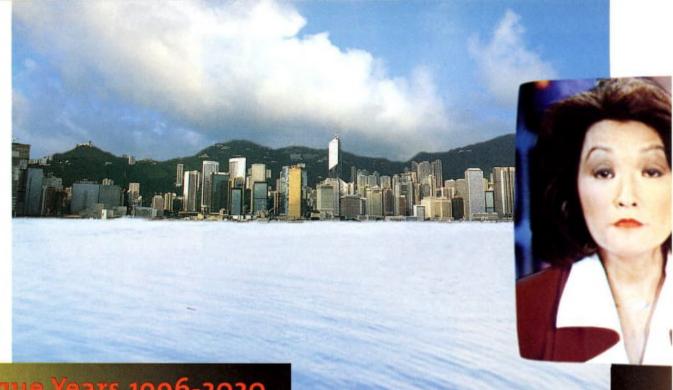
Given that we don't know which scenario will unfold, what do we do to prepare?

Some of the decisions we make today will make sense across all of the futures. Others will make sense only in one or two. Once we've identified those implications that work in all of the scenarios, we get on with them in the confidence that we're making better, more robust plans. The decisions that make sense in only one or some of the scenarios are tricky. For these we want to know the "early warning signs" that tell us those scenarios are beginning to unfold. Sometimes, the leading indicators for a given scenario are obvious, but often they are subtle. It may be some legislation, or technical breakthrough, or gradual social trend. Then, of course, it is important to monitor these critical signs closely.

Ultimately, that's the power of scenario planning. It can prepare us in the same way that it prepares corporate executives: It helps us understand the uncertainties that lie before us, and what they might mean. It helps us "rehearse" our responses to those possible futures. And it helps us spot them as they begin to unfold.







The Plague Years 1996-2020

Image manipulation by Eric Rodenbeck

IMANUA SEUDENCE: NOBERT LANDAUMESTUCIONI IDMIN TUNAVUNICENES IN MALLAH PERNWISABA: S. CAMAZINE/PHOTO RESEARCHERS, INC.: MOVIL STILLS ARCHIVE: WILLIAM FAUCKNER: SUPERSTOCK, INC.



Savior of the Plague Years



In the end, 20 years of horrific pandemics were halted by one brave doctor.

The Wired Interview with Dr. Amy-Jessica Castillo.

When she's not busy collecting a Nobel prize, caring for her two children, or working at the Virtual Bioresearch Institute of Montecito, California, Dr. Amy-Jessica Castillo pores through old video news clips and still images. She needs them for her Journal of the Plague Years, a combination autobiography and reenactment of the research process that she helped head and which conquered the deadly Mao Flu in 2020. We spoke to her just before she left for the Pan-American Virological Conference, where she would give the first demo of her plaque journal.

Dr. Castillo, how were you recruited into the fight against the Mao Flu some 20 years ago?

Well, of course, it was essentially the only problem anyone was working on in those days – in biomedicine, at least. I mean, it was a question of the survival of human culture above the hunter-gatherer level, that is. And everybody, of course, viewed Mao as a personal foe. Everybody on earth lost at least one family member to the flu. As it happened, I lost almost everybody in my life. So I didn't have much else to engage me.

At that time, you were a postdoctoral student at the University of California, San Francisco, working under Dr. Lawrence Kerscher, so you must have been affected by the disaster at the UN's Denver PandemiCon 2000. Yes, Denver was the single most devastating event in the fight against the Plague, and it set us back by at least a decade. Kerscher was a conference delegate, along with essentially every significant virologist, immunologist, and epidemiologist in the world. Every attendee of the conference died within days of returning home. Many carried the virus with them, infecting their entire research staffs.

They all died?

There were no survivors. Dr. Kerscher flew from Denver to another conference in Singapore, but when word of the Denver infections got out, the Singaporean government sealed and quarantined his plane until everyone was dead. Then the

PandemiCon 2000 resulted in the loss of the world's most gifted bioresearchers. All the attendees shown in the photo below - wearing safety goggles to prevent aerosolized particles from entering their bodies - were dead within six days.

Ironically, it is now generally agreed that the loss of orthodox research structures is what led to the ultimate cure.

In what is one of the most remembered images of the Plague Years, the bodies of Dr. Lawrence Kerscher and 67 other passengers are incinerated inside a Cathay Pacific Airlines 747 at Singapore's national airport. Through draconian measures, Singapore managed until 2002 to avoid a major Mao Flu outbreak, at which point it was the only intact and functional Asian city-state. Asia was hit first and hardest



2001 In a magnificently paranoid gesture, New York health officials sealed the UN Building inside orange polyethylene sheeting. The structure was a virtual time capsule for the next 19 years - as was an almost uninhabited Manhattan. Urbanites fled to rural areas until local militias destroyed roads and bridges.



aircraft was incinerated right there on the tarmac.

In effect, the entire senior level of relevant bioscience vanished. How did your colleagues deal with that? We coped. People have suggested that the premature inheritance of bioscience by postdocs and junior faculty was what enabled us to develop such a radical solution to Mao, but it didn't seem like that at the time. It was hell, technically. And of course, this was in the midst of total social breakdown. It's really difficult for people of my

generation to comprehend the kind of panic that the Mao Flu generated. We've all heard stories about families abandoning relatives, doctors leaving patients....

Did you ever see anybody bleed out with Mao?

I've seen the films, of course. You haven't any idea then. First of all, you have an incredibly communicable disease that is spread by aerosols: a single 10-micron droplet - far too small to be seen with the naked eye - is enough to infect. Secondly, the onset is extraordinarily rapid: incubation is 10 hours, sometimes less, and during most of that time every exhaled breath is as deadly as nerve gas, because the mortality with Mao was 99.8 percent. Then come six hours of increasing malaise, which fades into neurological disorder, as in rabies. Then massive internal clotting, organ dissolution, bloody vomiting,

bloody diarrhea, blood pouring from the eyes, nose, and the other orifices. Of course, the cherry on top was that right up until the very end, you had this hideous energy. The Hong Kong Jog, they called it. People ran through the streets, blindly, pouring deadly sprays of blood onto anyone who tried to stop or help them. And while we're on that subject, the problem was not that the medical personnel ran away; the problem was that they stayed, uselessly, as it turned out. Essentially, all of the medical personnel in Africa died in the first six months. and about 95 percent of those in Asia outside Japan and the Asian dragons. Latin America lost almost go percent.

Europe, the United States, and, as you say, Japan, did somewhat better though?

Comparatively, which isn't saying much. Only a third of the medical personnel died. Only! And, as I mentioned, the research system was decapitated in the first year of the pandemic. At first, we tried to stay at our original sites.

The cities were emptying out into the countryside. That's when the rural militia groups began dynamiting bridges and interstates. It was terrible. Of course, the airports had long since closed. For a time, international commerce simply died. That was when the Hygienic Alliances formed, but I suppose I'm getting ahead of myself here





2008 Near the end of the millennium's first decade, marriage at the age of 14 or 15, followed by rigidly codified monogamy, had become the norm. Weddings themselves, involving "crowds" (by then a pejorative term), had become, at best, glum exercises in community noncontamination.

2005 "Sterile Communities" sprouted spontaneously at the end of the 20th century, and almost instantly defined human habitation for two decades. The Mt. Tamalpais Sterile Community was one of the more civilized enclaves. Most had shoot-on-sight policies as well as cruel quarantine facilities.

The United Nations tried to implement the not particularly successful "hygiene card." By 2007, fear of outsiders was too firmly a part of life to be mollifled by bureaucracy.

HYGIENE PASSPORT

NAME: AMY-JESSICA CASTILLO
LOCATION OF ISSUE: EMERYVILLE, CA. USA
ISSUE DATE: FEB. 2007 SEX: F. AGE: 32
RESIDENCE: 1394 MASONIC SF. CA.
USA 94107-03445-0101
GENOME IDENTIFIER SEQUENCE:

CGATCTATTAGATGAGTTA AUTHORIZED IN: NORTH AMERICA HYGIENE ZONE-CIVIL AVIATION



After this initial collapse of the urban areas, you had to retreat to a sterile enclave, like everybody else. Yes, I got across the San Francisco Bay to Mount Tamalpais, A mob trashed the UCSF lab because a rumor had begun that we'd found a cure and were keeping it for the rich in the lab's secure enclaves. I had no money to buy in to the Mount Tam colony, and I'd lost my health passport in the riot, but they needed virologists. Fortunately, Jimmy Steinglass, who'd worked in our lab, was already there, and he vouched for my academic credentials. Without that, they probably

I'd like to turn to your work in the enclave now. This was a little less

would have sent me back

than two years after the initial dieoff in Hong Kong. What was the
status of the research effort then?
The first thing you have to understand is that we had two resources,
without which there would've been
no cure. The first was the Human
Genome Project, which had been
completed around five years before
Mao hit. The second was, of course,
the Net, with the Big Glass enhancements we completed in 2010.

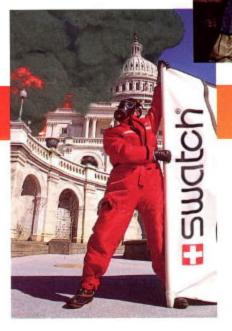
So the situation at this point was that as many people as could, a tiny percentage of the population, were living in sterile enclaves, but most people were still hiding out in rural retreats or the vastly depopulated cities. The planet had been divided into larger enclaves called

the Hygienic Alliances. The US and Europe, South America and the Caribbean, the giant Asian bloc, and so on. There was virtually no travel from one alliance to another, no way to bring a group of researchers together. All the surviving biomed personnel in the US amounted to fewer than 200, and there were no older people at all. The Children's Crusade, the media called it. Our first big task was to track down all the bioscience people scattered throughout the various enclaves and make them into one team. This we were able to do, because of the telepresence made possible by the Net, I was in Tamalpais with Jimmy Steinglass; there was Hidori Takahashi in Kyushu; [Paul] Emerson

amid the remains of CDC-NIH in Key West; and, of course, Javier [Rivera] and the structural visualization team in Quebec. Average age, by the way, was 28. The point being, we were all in the same lab. We "saw" each other every day; we "showed" one another things. Eighty-five percent of the Internet nodes were wiped out worldwide, but the Net did exactly what it was supposed to do; it survived.

So this was the origin of the Virtual Bioresearch Institute? How did you proceed, once you established contact across the Net?

Well, to understand that, you have to understand a little more about Mao Flu. It's a hemorrhagic fever virus, of course, but Mao was a lot 2012 Fashion, as ever, continued as both an engine and a mirror of the times. Textile industries flourished during the Plague Years owing to the ease of fabric quarantining and sterilization. Benetton, once famous for its shock advertising tactics, took on a poignant dimension after its purchase by Parco Department Stores of Japan; Swatch (below) became the voice of biomilitancy, rivaling Greenpeace in its shock tactics, shown here after its June 4, 2012, capture of the US Capitol.



2018 A cure, yes – but how to deliver? In the end, capitalism proved a most effective means, its soothing slogans able to deprogram decades of entrenched paranola. McDonald's – one of many "dormant corporations" with assets held in trust over 20 years by the Delaware Dormancy Act – came back to life almost instantly with its McCure Meals. Several hundred surviving franchise outlets fueled postcure pre-Plague nostalgia.

worse because it also knocked out the immune system—like HIV, except without the latency period. In that sense, it was like HIV on speed. A very efficient killer.

So it would seem. A lot of people have suggested that it was, in fact, designed as a weapon by Chinese military hard-liners.

[Laughs] Well, if they did, the joke's on them, isn't it? What's the population of mainland China now? Thirty million, down from nearly a billion? No, that's as silly as saying it was a judgment of God. Nobody could've designed a virus like Mao and built it with what we knew before Mao hit, certainly not the Chinese. But there was the business of the pigs and the transplant experi-

ments they were doing before the outbreak. What about that?

Point taken. We have some evidence that the Chairman Mao Institute for Medical Research in Beijing was doing immunosuppressive research on pigs to support its organ transplant industry, which was booming in a particularly nasty way before the collapse. Now whenever you get a new virulent human pathogen, you can be pretty sure it comes from a pathogen that's based in an animal host, usually a domestic animal host. Pigs, for instance, are a major source of novel human flu viruses, so we can imagine a situation where the Chinese techs are using a modified HIV to knock out the immune system in pigs. So this little immunosuppressive bug marries a flu bug and voila! You have HIV-flu, capable of devastating the human immune system not in years, like HIV, but in hours. By the time we realized what was happening, it was way too late. There were Chinese refugees all across the world, and China's airline fleet was full of people that they had infected....

Returning to your research strategy — I imagine that you wanted to focus on the immunosuppressive aspects of Mao.

We established two teams. One concentrated on the method Mao used to devastate T-cells so quickly. The other was supposed to look at the virus itself. Gilles Anderson ran the first, along with the Pasteur

people in Gstaad. I was leader on the virology team. Our initial hope was to find some weakness in Mao that we could exploit. But what we found scared the living daylights out of us.

enonalds

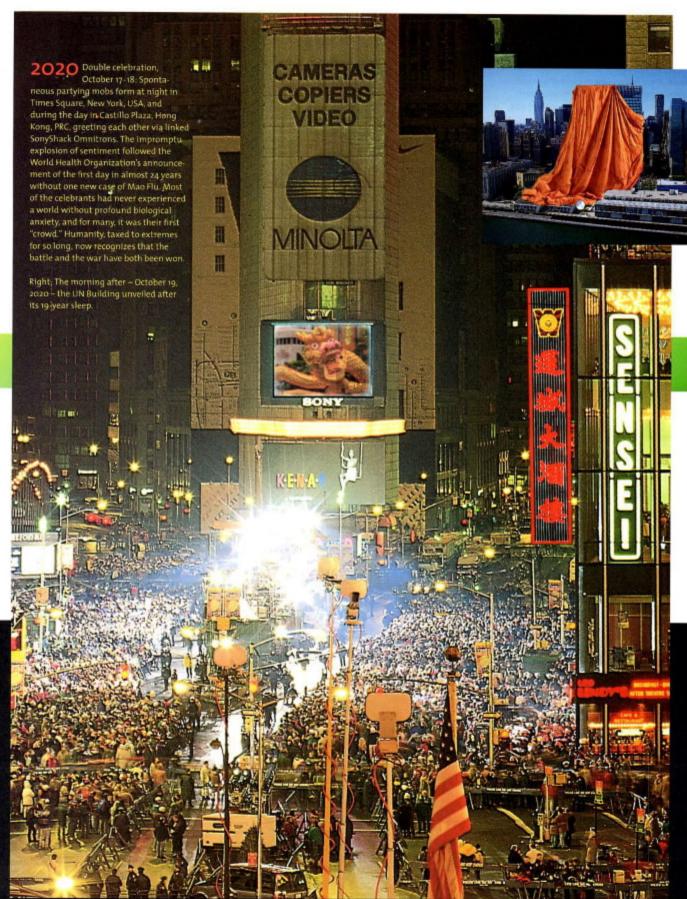
UNITED COLORS OF BENETTON.

It didn't behave like the HIV viruses that you were used to?

That's only part of it. What we discovered – what Jean-Paul Maurier and Gilles discovered – was that one of Mao's viral subtypes, Mao-alpha, didn't just attack killer T-cells; it subverted them. It invaded them, kept them alive, and made them attack helper T-cells and other killer T-cells that carried Mao antibodies. In hours, it converted the entire immune system into an ally. We were devastated. 148 >

IMAGE SEQUENCE, FAY TOWNSFND/GREENPEACE, ITN/GAMMA; NED GILLEFTE/FIPE STOCK MARKET; SOVFOTO/EASTFOTO; MARK STEPHENSON/WESTLIGHT





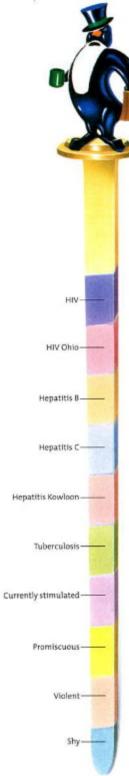
2066

American law dictates that the "Angel of Mercy" – an intrauterine device – be implanted immediately upon detection of pregnancy. The abortioninhibiting device recognizes any trace of RU 486, analogs, or other abortifacients, then releases neutralizing compounds and an electronic signal. Unlicensed removal triggers a mild lobotomizing drug, Depensazine, which renders the host mother comatose for a minimum of nine months. Made by the US Department of Energy, Sheridan, Wyoming.









2095

Swizzle stick from Starbucks Coffee
Antarctic Courtyard Hotel, McMurdo
Sound, Antarctica. Stick is made from
a cornstarch base impregnated with
saliva-sensitized enzymes and generesponsive marking bands that indicate past germ exposures as well as
any behavioral dispositions to shyness,
violence, and promiscuity. Current
status of sexual stimulation is also
indicated. Made for Starbucks Coffee in
Whitehorse, Yukon Territory, Cascadia.

Contraceptive chewing gum for males containing patented Motilidox, a "sperm mobility inhibitor." Made for Squibb+Playtex, Mexico City, Mexico.



Anticoncepción Masticable para los Hombres

12 pieces

NEU

Squibb+Playtex

.with Motilidox ...con Motilidox

2089

Baby gender-selection tablets: pink for girls, blue for boys; 12 of each per box. Made by Volkswagen AG in Munich, Bayernische Republik.

2056

Plastic bottle of 25 Gerontene tablets, a prescription-only, Buckminsterfullerene-based hormone delivery system that extends the child-bearing age of women to approximately 70 years. Hormones are made by Elf Petroleum in an M-44 Lombardy-built zerogravity pharmaceutical production satellite.





100% GARANTIERT

inderChoose

24 GESCHLECHTSSPEZIFISCHE TABLETTEN

100% UMWELTFREUNDLICH

Jede Tablette enthält

2034

Illegal in many countries, but still very common: a battery-powered sperm centrifuge used to separate XX sperm from XY. Made by Bally-NASA's facility in Guantao, People's Republic of China.

Douglas Coupland is the author of Microserfs.





stated goal of stated goal of installing centers in all states within a decade of the Disney WorkThink division's formation, puerto Rico had been the final holdout to Rico had been the final holdout against what critics have called "the against what critics ha

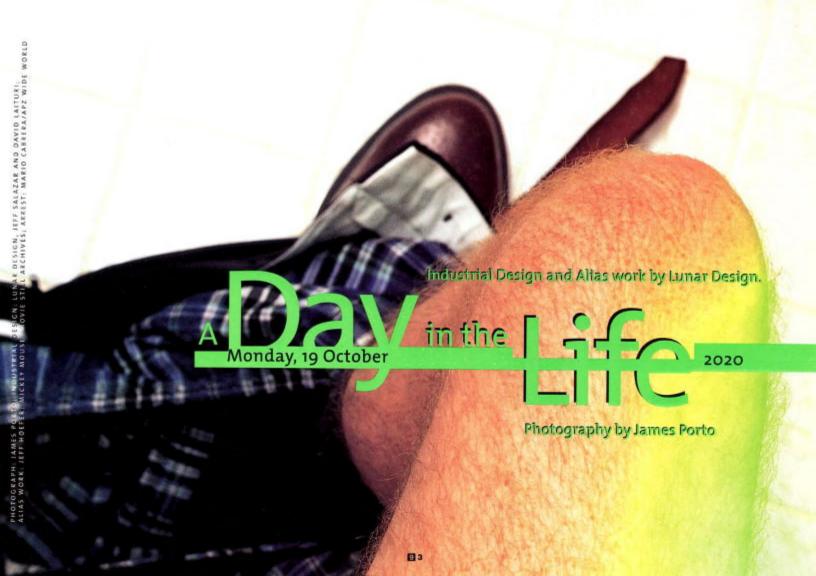
part theme park, part education
Part theme park, part education
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center, Disney's San Juan school will
allow students aged 12-60 to work
on local nature preserves, learn
on local nature preserves, learn
genome code-writing and -input
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UnDeath Spray... to conceal his
pleasure over the EU Bioethics
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process to proceed – a decision that
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working toward?"

If human trials confirm the animal fl human trials confirm the use of models, Virgin expects the use of its patented viral-vector to extend the average adult life-span any. The where from 15 to 18 years. The where from 15 to 18 years treat-one-time-only nasal spray treatment is estimated to cost ment is estimated to cost usnew\$5 to manufacture, but industry insiders expect Virgin industry insiders expect

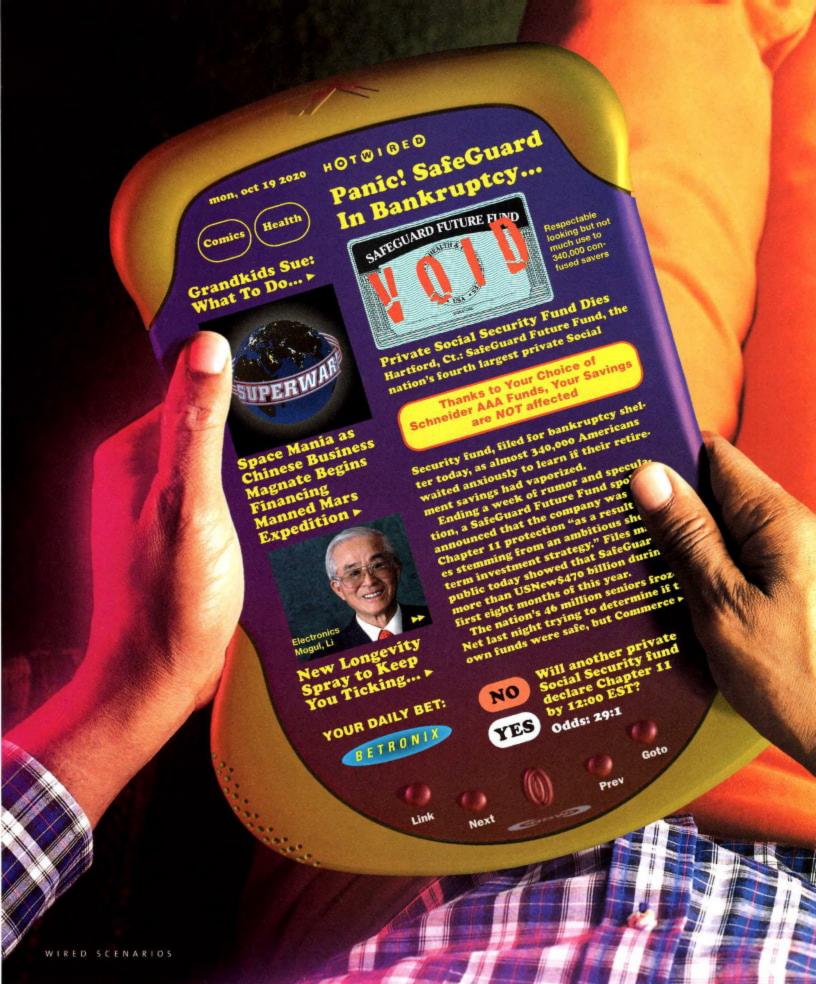
French President Dies - Georgetown: Sources in the State Department have rejected published reports that the United States was behind Saturday's poisoning of lle de France President Raymond Attali. Instead, they suggested that Attali's death was the result of internecine jockeying among new statelets created after the dissolution of the former France. While admitting that United States' displeasure had been mounting over lie de France's continued export of genetic warfare weapons to Central Asian combatants, these same sources categorically denied involvement in Attair's assassination. "Poisoning is just not our style," said











MAGE JAMES PORTO

Global Neighborhood Watch Stopping street crime

in the global village.

By Neal Stephenson

I live in a pleasant, middle-class, mixed-race neighborhood in a big West Coast city. The only real problem here is property crime. It's not a dangerous neighborhood by any stretch of the imagination – June Cleaver could walk down the middle of the street naked at 3 a.m. and feel perfectly safe. Even so, we do have our Eddie Haskells: A car gets broken into or stolen every couple of weeks. Burglaries occur a few times a year.

You'd think that we would do something about it. But we busy middle-class people, contrary to stereotype, are nothing if not adaptable. The first time something happens it's an aberration. The second time and thereafter, we absorb it into our routine. So when one of us goes outside in the morning and finds a glittering spray of safety glass where our car used to be, we make calls to the cops and the insurance company, then wait for a check in the mail. We rarely see the police. We never see the criminals.

Until a few weeks ago. A youth gang strolled into our neighborhood in broad daylight on a weekend afternoon, smashed out a window on my neighbor's car, and tried to steal it. When my neighbor pulled up in a second car and took issue with this plan, the gang objected to his objections, battered his second car, and threatened to come back later and kill him. They were genuinely outraged that one of their victims would actually have such temerity. Crime had become just as easy and routine for them as it had for us.

The next weekend, as an experiment, I spent the wee hours of one morning looking out through my front window. I half expected to see the street fill up with pimps, prostitutes, and drug dealers at the stroke of midnight. My activity log for the night looked like this:

1:00 began watching street 1:15 car went by 1:25 paper carrier came through 4:00 went to bed.

Every so often, a stray dog would trigger a series of motion-activated security lights, leaving an irregular trail of radiance across the block, as if a fighter-bomber had flown over, strewing sticks of white phosphorus.

If this was a typical night, my enthusiasm for a block watch program wasn't going to last. Even worse, there was nothing for me to write about – no potential source of income. If only we had some way to know when the bad guys were actually out there.

But hey, I said to myself, wait a second. That's an informational problem – a technology thing. And technology is supposed to solve real problems, not just enable us to download digitized photographs of Ken and Barbie in a coprophilic ménage à trois with Barney.

Thus was born the Global Neighborhood Watch concept. The plan is, with Wired's help, that we get little video cameras and aim them at those parts of my neighborhood where most crime happens. We will digitize the output of those cameras. We will include motion detectors so that the cameras will spit bits only when something is actually happening (maybe 0.1 percent of the time). We will hook the neighborhood computers into the Internet, probably through an ISDN connection (available for cheap over existing phone wires). We'll use CU-SeeMe shareware to send the video out. 146 >

author of The Diamond
Age and Snow Crash,
among other novels.
He has an uncontrollable
compulsion to play with
computers, of which
Global Neighborhood
Watch is merely the latest manifestation.

Neal Stephenson is the



The Museum of

Tiny and great leaps for the human race.

By Charles Platt

Biological RAM Chip

Developed in 2005 by BioDevices Inc., based in Mountain View, California, this chip was the first commercial use of an organic compound for data storage. "Biological sludge" consisting of a crystalline protein was chemically tailored to bond onto access points on a RAM chip. The sludge accreted in 10,000 additional layers, and each layer stored aimost as much data as the original chip. The finished product was able to hold to Gbytes.

Nanoscale Braille

In 2005, a Dutch-US consortium perfected the application of "bumps" of atoms on an ultra smooth surface to represent bits of data – creating a revolutionary new storage medium. A massive array of 10,000 tiny, independent mechanical probes scanned the surface, reading data and moving it from one location to another. Each bump of data was about 30 nanometers wide, allowing a single square centimeter to store around 10 Gbytes.

DNA Data Storage

In 2010, Living Logic Systems of Minneapolis marketed the first cost-effective DNA memory device (a simulation is shown here). Using a technique pioneered 15 years earlier at New York University to force the normally single-stranded DNA molecule to branch into six strands, Living Logic created crystalline DNA: huge arrays of cubeshaped cells, linked like a vast jungle gym. Clusters of copper atoms were attached to each cell in the array, and data was stored by attaching electrons to the clusters. The final result? A chunk of branched DNA about the size of a sugar cube that could store almost 10 petabytes (10 million billion bytes) of information.

The Units of Nanotech: 1 millimeter = 1/1000th of a meter 1 micron = 3/1000th of a millimeter 1 nanotheter = 1/1000th of a micron



Asteroid Terraforming

The asteroid shown at left is being reworked by preprogrammed nanoscale robots to create a fully equipped space habitat for human colonists. The robots were sent out on a conventional rocket that crash-landed on the preselected asteroid. After the nanosystems used indigenous carbon and metal ores to make billions of copies of themselves, they set to work converting the asteroid. When human colonists arrive, they will find comfortable residences ready and waiting. Since this initiative began in 2050, almost 5 million people have relocated to the asteroid belt. Already we are seeing a new generation that has never experienced life on Earth.

Nanotechnology Images by Michael Crumpton

It wasn't until 2030 that a Vietnamese medical institute developed the first reliable "nanobot" that could neutralize cancer cells. The nanobots were hypodermically injected into the patient's blood in vast numbers. They were subsequently controlled from outside the patient with acoustic signals - pressure waves providing orientation data in the same way that global positioning satellites were once used to orient a person on the surface of the Earth. When a cancer cell was found, the nanobot released one molecule of an enzyme that welded a protein to the ribosome, killing the entire cell.

Space Beanstalk

This massive engineering project, initiated in 2040, was funded by a consortium of Chinese, African, and Latin American investors. A superstrong cable was fabricated in geosynchronous orbit, extending gradually down to the Earth's surface. Diamond strands possessing 50 times the strength-to-weight ratio of aerospace aluminum were fabricated from carbon atoms by swarms of nanomachines. Still in use today, this 25,000-mile-high beanstalk contains elevators that have lifted millions of people and billions of tons of resources from Earth into space for mining and colonization. Nanosystems continue to function in the beanstalk, constantly monitoring it for weaknesses and maintaining structural integrity.

Developed under strict security by the US Department of Defense in 2025, these molecular manipulator "swarms" became the Ford Model T of the nanotech revolution. The swarm shown below (which makes up one manipulator) contained about 4 million atoms, and could be remote-controlled to build structures such as eyeballs one atom at a time. The tiny size of the individual nanobots allowed the swarm to perform a million operations per second - a phenomenal rate at this point in

> (cp@panix.com) writes science fiction and nonfiction related to technology. His new novel, Protektor, will be published early in 1996.

Charles Platt

The New World

A scenario:

Civil War in Mexico, the Frankmark in Europe, white supremacist secession in the US Northwest, nuclear bombs in the Tergiz oil fields of Central Asia sending oil prices over US\$100 a barrel – US President Christy Whitman has her hands full in the year 2013.

The new world order that many people expected with the end of the Cold War turned out to be vastly more complex and chaotic than the simple bipolar system that had endured for the previous half century. Starting in the 1990s, global economics and politics diverged. By 2010, the world was carved up into three rigid and distinct trading blocs, but political boundaries were more fragmented than ever, and ethnic conflicts raged out of control worldwide.

The most powerful trading bloc was the European Union, which, by 2012, included most of Eastern Europe and Russia. The trading bloc was almost entirely closed to the outside world; protecting jobs was the central tenet of European trade policy. Few Japanese cars or American computers were anywhere to be found. But the resources of Russia and the growing markets of Eastern Europe more than made up for the European Union's lack of access to the Asia Pacific Region. The EU had achieved a common, if not single, currency by 2005: the Frankmark was good anywhere within greater Europe. The entire region maintained tight border controls, stanching the flow of immigrants from North Africa and the Middle East, and protecting local jobs. Indeed, a steady stream of Muslims was expelled from France, the UK, and Germany on a variety of

trumped-up political grounds.
And just as the UK had done
with Hong Kong, France
refused to admit French passport holders from Algeria.
When Algeria's military regime
collapsed in 1997, fundamentalists began the systematic
execution of anyone found
with a European passport.

To the east, Russia surprised everyone by how quickly it recovered from the chaos of the mid-1990s. Boris Yeltsin's inept regime gave way to the 12-year rule of General Aleksandr Lebed, a strong nationalist leader who was democratic in his orientation, progressive with economic reform, and able to restore the confidence of the Russian people. With its close ties to Europe, Russia posed no threat to its Western neighbors. But countries to the east and south - China and those in central Asia - remained wary. Although the Russian military had not recovered from its effective dissolution during the Yeltsin era, its massive nuclear arsenal still remained quite a powerful threat.

The second major trading bloc, the Asia Pacific Region, included most of East Asia, China, North America, and much of Latin America. The Asia Pacific Economic Cooperation had slowly evolved into a trading bloc in response to the European Union, absorbing

Nafta along the way, But internal political and economic realities made APEC much weaker than the EU. While China, Unified Korea, Southeast Asia, and most of Latin America grew rapidly, the more mature - some would say sclerotic -Japanese and US economies were barely increasing. By 2010, the Chinese economy was almost the same size as the US's and much larger than Japan's. Nonetheless, the US continued to expend enormous amounts of political capital on gaining access to Japan's relatively small market, and it frittered away even more capital in attempts to convert the Chinese to a Western sense of human rights. It was a policy that backfired and cost the US its limited access to the Chinese market. Furthermore, Japan's failure to pay promised reparations for World War II only deepened China's enduring antipathy. These mounting differences eventually led to the expulsion of Japan and the United States from the Asia Pacific bloc in early 2013. The bloc's Latin members had to go along or be expelled, although Brazil's economy was too closely linked with North America's to be separated completely.

Peter Schwartz (infomatrix@ gbn.org) is co-founder and president of Global Business Network, a think tank and strategic consulting firm that has pioneered the use of scenario planning.

By Peter Schwartz Order Schwartz Order Schwartz Order Schwartz

One of the big surprises of the time was how well Latin America was doing, despite the perpetual war in Central America. What began as US military support for Drug Enforcement Administration raids during the first Dole administration erupted into a Mexican civil war. The battle spread into Central America, eventually including every country but Costa Rica. Although Mexico's insurrection-wracked economy eventually collapsed (sending a flood of refugees across the US border), other countries to the south began to prosper. Brazil and Venezuela - like Argentina, Chile, and Peru - finally began to seek internal organization, both socially and economically. The massive success of Brazil and Venezuela helped drive growth in Latin America, and the economic potential of the region began to be realized. Democracy prospered in most of these nations. But the region's political and economic orientation shifted away from North America and Europe, toward the Pacific. The exceptions, of course, were Colombia and Mexico - both consumed by the US drug war.

The third trading bloc developed around the Indian Ocean as a response to the first two blocs. Its key members were India, South Africa, Saudi Arabia, and Iran. The region's long history of trade and political

relations, as well as an acute sense of exclusion from the West and Asia, served it well. India's growth and modernization were the key drivers for the region. Although the active repression of minority conflict by India's Hindu leadership provided plenty of ammunition for Amnesty International, other south Asian countries - even Pakistan - muted their criticism so they could participate in the region's trade. Below the Indian subcontinent, most of central Africa continued to sink into the turmoil of war and disease, despite South Africa's attempts to help the nations just north of its border. But overall, the Indian Ocean region was doing remarkably well. Perhaps because of this, perhaps in spite of it, tensions continued to grow between the Indian Ocean bloc and the Euro pean and Pacific blocs. Occasionally, a ship disappeared on the Europe-Asia route. But no one was sure if the cause was piracy or an official warning from the nations of the Indian

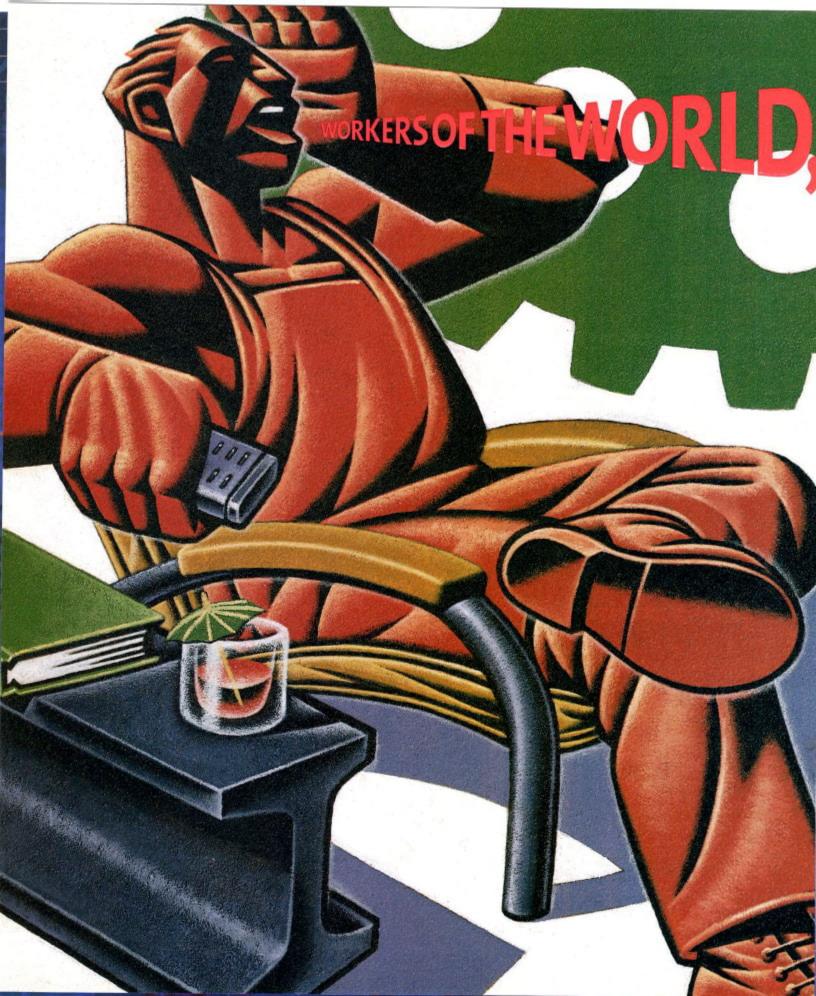
After all, the trade blocs did not act as security organizations – those security organizations that had once existed were mostly gone. The dissolution of NATO began with its failure to deal with Bosnia, exemplified by Germany's premature recognition of Serbian nationalism. Another blow to NATO was Turkey's unexpected withdrawal, triggered by Europe's failure to admit the country into the European Union (as had been promised in 1963). Increasingly, Turkey turned eastward and southward toward the Muslim world. Indeed, mounting pressure on central Asia from Turkey and its oil-producing allies in Turkic Iraq and Turkmenistan appeared to be driving the region toward a wider war. Attempts to construct oil pipelines in these areas were often disrupted by terrorism and local conflicts.

There were many causes for the thousands of conflicts that covered the globe. Explosive nationalism had come on the scene with the end of the Cold War and continued to thrive. Religious groups - Christians, Muslims, Hindus, and others fought on many fronts. Crime from smuggling to piracy to drugs - was a central source of conflict as nations were unable to maintain any semblance of international policing capabilities. Environmental issues such as climate change, regional air quality, nuclear waste, and access to water, were also sources of conflict with no mechanisms for resolution. After all, a problem's source

often lay in a different country from the one in which it was experienced. In addition, the rampant spread of new plagues threatened to destroy the worldwide airline industry as nations sought to contain the virulent diseases.

Nor was ethnic conflict limited solely to Europe, Africa, and Asia. After the breakup of Canada, initiated by Quebec' withdrawal, the provinces of the far west sought - and were on the way toward receiving admission to the United States. But the white supremacist Free Cascadia Movement - seeking independence for Idaho, Washington, Oregon, Alaska, and Western Canada - blew up the nuclear waste dumps at the Hanford site in southern Wash ington. The resulting fallout poisoned the Columbia River, making a significant portion of southern Washington uninhab itable. The growing number of brutal killings of Native Americans, Asians, and Hispanics in the region added to the forced migration from the Northwest It was the combined influx of these refugees and those from the Central American conflict that once again brought California's economy to its knees.

Underlying the world's increasing political fragmentation was a historic change. By 2010, it was clear that Europe's 500-year domination of 150 >



RELAX

The Leisure Party Manifesto

A specter is haunting the world – the specter of leisure. All the great powers have conspired against it: Popes and presidents, bankers and unionists, hamburger chains and environmentalists. But, mighty as they are, they will soon fail. Machines may exist solely to produce, but humans are awakening from dark eons of drudgery to the dawning realization that there is more to life than work.

We, the overworked, the stressed-out, the weary, the jet-lagged, declare that the Industrial Revolution is over – and we have won!

It is time to declare the peace dividend.

In the Age of Thinking Machines, leisure is no longer a privilege – it is a fundamental human right.

The days of work are over!

For thousands of generations, work – dirty, backbreaking, crippling work – has controlled our existence. Apologists for the status quo rationalize that toil is humanity's natural fate and burden. But lo, fellow workers who gather food, erect elaborate shelters, and build great civilizations, labor is not our natural destiny. Inactivity is not a sin!

When not to work meant not to eat, when the tribe's survival was at stake – those were times for toil. The genesis of Intelligent Machines should have freed us to enjoy life, but in our fear of obsolescence we did not heed nature's imperative to leisure. Instead, we stagger on, punching buttons, making copies, renting our brains for the fool's gold of ever greater consumption. Is this our birthright – we, the mighty creators of robot factories, electronic brains, and the virtual civilizations of our imagination?

Do not lions lounge? Do not gulls drift effortlessly on the winds? Do not dolphins play endlessly in the oceans? Are we less deserving than our fellow creatures to partake of the joys of life and the wonders of the planet and human society?

Civilization without leisure is no civilization at all!

We do not seek to overthrow the system but, rather, to underthrow it.

We do not advocate resistance; we counsel surrender – surrender to your own intuitive sense of what your body and soul need, to your innate right to sloth. We call not for sacrifice, but for indulgence – indulgence of our need for greater fulfillment through play and contemplation.

Leisure is not a carrot to spur our noses to the grindstone; it is a basic human right. To work for the vague promise of a short respite is criminal extortion. We will achieve the leisure we deserve only when we change our priorities and live the revolution of the deed. Our debt of leisure constantly mounts, but do we ask for our due? Do we realize what we're owed?

Take a nap! Carpe otium! You've earned it.

If machines and computers want to work, let them!

Leisure is the new currency and your credit has no

limit. Relaxation, in its purest form, is an essential

component of human creativity. It is the yin to society's

infoglut yang.

Wake to the dawning of the Age of Leisure! Machines have made the need to work obsolete. To continue on is folly. Grab a chair, sit back, and claim what is rightfully yours. Leisure. There is no substitute.

Workers of the world, join The Leisure Party! Relax!

You have nothing to lose but your slavery to the opiate of busyness – and the world of leisure to gain! ■ ■

eople love to make predictions. People love to read predictions. Above all, people love to believe predictions; it gives us the feeling we know the future. After having written two books about "the future," however, one thing I've learned is that the future cannot be known in advance. To know the future, you'll have to wait until it actually arrives.

So I've developed a short course in prediction avoidance.

First are the reasons not to make predictions:

 A prediction is an assertion that the future will turn out in a certain way. But with the exception of matters covered by the hard sciences (including mathematics), the future cannot be known. There are lots of molecules jostling around out there, and lots of physical forces, and the way all of them will interact and combine to produce "the future" is a computationally intractable problem, especially when free will is thrown into the picture. So forget it.

By Ed Regis

Caveat Predictor

- Saying that the future will turn out a certain way gives you the illusion that you have knowledge, when in fact you don't. Illusions are to be avoided wherever possible, and in this case it's possible.
- It's a waste of time. With the time you've spent trying to know the future, you could do something that was theoretically possible and personally useful, like learning to play the piano.

Of course, in our future-obsessed society it's hard not to be inundated with others' predictions. Here's why you shouldn't believe them:

 The truth of a nonscientific prediction cannot be established. Believing a prediction, therefore, amounts to accepting as true a statement that cannot be known to be true. This is a bad idea.

Ed Regis (edregis@aol.com) Chicken and the Transhuman Condition (Addison-Wesley, 1990) and Nano: The Emerging Science of Nanotechnology (Little, Brown, 1995).

- In many cases, a prediction would have no effect on your is the author of Great Mambo current existence – even if that prediction were known in advance to be true. Since it is not known to be true, you have no good reason to let it govern your behavior in the present.
 - 3. Most predictions are wrong. Since there are far more ways in which reality might turn out than the way forecast by a given prediction, limiting your action to the one specific outcome is, or may be, self-defeating.

Notwithstanding the above, some predictions are unavoidable in order to get through life, for example: "The road will continue on the other side of the hill." My objections refer to avoidable predictions. In my experience, most predictions fall in this latter category.

I have no objection to anyone reading predictions. Go ahead and read them; after all, it's fun. Just don't confuse predicting the future with knowing what's going to happen.

DEAR NETSCAPE AND INTERNET IN A BOX, DADDY'S HOME.

The first real, grown-up Internet access package is here. Quarterdeck InternetSuite¹⁵.

With a second-generation collection of tools that give you more of the Internet than anybody else can.

With Quarterdeck Mosaic, a rewritten-from-the-ground-up version of the package that started the World Wide Web revolution. E-mail to keep in touch with people around the world.

Telnet to log into other computers, on-line chat sessions and

games. FTP to help you exchange files. Usenet News to join more than 14,000 discussion groups.

And Gopher to find particularly hard-to-find information.

All in one ridiculously easy to use package that connects you to the full breadth of the Internet with a single phone call, no matter where you are.

You don't have to play around with kid's stuff any more. Visit www.qdeck.com, your retailer or call (800) 354-3222 for details.

While Quarterdeck InternetSuite takes you out exploring, Quarterdeck WebAuthor" helps you put up your own home pages and Quarterdeck WebServer" lets you set up your own Web site. No one has a wider range of products for the Internet,



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InternetSuite

PHOTO: WILLIAM FAULKNER

Packing tips for your trip



(to the year 2195)

by Sandra Noguchi

Congratulations!

You've just won a two-week, roundtrip ticket to exactly where you are right now – but in the year 2195. So pack quickly! Your only packing restrictions:

- You can't bring anything of a size that United Airlines wouldn't allow you to take along.
- You have to bring one object that proves you're from the year 1995.

Issues To Consider Before Fetching The Samsonsite

Life Support

In accepting your ticket, you also accept that the world might not be biologically inhabitable in 2195. Do you bring a radiation suit? A Geiger detector? Bottled water? Freezedried camping meals? (Yuck!) Topographical maps? What does the US Army pack when it wants to enter zones of possible profound uninhabitability? Is Tang called for?

- ✓ camping meals
- ✓ geological survey maps of your neighborhood
- ✓ Evian
- ✓ Tang

The Future May Well Be An Ugly Dump

Whenever people get misty-eyed about traveling backward in time, they usually assume their journey will be "vaccinated." That is to say, they want a return ticket, pox and polio vaccinations, contact lenses, appendix removal, membership in the ruling elite of the time they wish to visit, vitamins, etc. To reverse this situation, how might

this sensibility work if a person were to travel forward in time? Is the future a Third World country? What hygiene essentials will a traveler require?

- ✓ antibiotics and tetanus booster
- ✓ toilet paper
- ✓ Halazone tablets to purify water

Arms, Armor & Ammo

Imagine that you live in George Washington's time – and you visit 1995. You might bring a blunder-buss and look awfully silly walking around your neighborhood. Would you even need a blunderbuss or any other weapon in 1995? It's your decision.

- ✓ handgun and bullets
- ✓ Swiss Army knife
- ✓ Mace

Prove That You're From 200 Years Ago

As far as I know, you could already be from 200 years ago. Assuming people 200 years from now still speak your language, they'll probably look at you and say, "Get out of my face, loser," before you get a chance to elaborate. Therefore, you want to bring along something that has no conceivable chance of existing 200 years from now:

- a Kimodo dragon or some other animal on the cusp of extinction (but what if factories make pandas and spotted owls in 2195?)
- ✓ a box of Pop-Tarts with 1995 packaging, plus expiration dates
- CDs, this week's favorites

(Question: How will these people know that you're not really from the future and are tricking them into thinking you're from the past? It can get dodgy here.)

Money? What's Money?

Gold, platinum, or thorium may well be valueless in 2195. What artifacts from now might you bring if you had to trade in order to get, say, food? Remember, chances are that the things of value in the future are the things you could have had no way of knowing would be valuable: an autograph from Button Gwinnett; IBM stock; fertilized passenger pigeon eggs. Future citizens might also end up ransacking you for semi-random items - like Monty Hall of Let's Make A Deal offering you US\$500 for every paper clip you've got. Some packing ideas:

- comic books
- ✓ fruit juices
- ✓ celebrity autographs
- ✓ Franklin Mint Star Trek™ dinner plates
- drugs or mood-altering pharmaceuticals
- ✓ baseball cards or stamps
- samples of your own blood or reproductive cells
- ✓ California chardonnay
- ✔ Freon

(Tip: Do you know any information right now that might be useful to people in 2195? What could somebody from 1795 tell you right now that might even be interesting, let alone valuable?)

We Come In Peace

Future humans may well be prepared to be nice to you ... assuming you bear a friendly enough gift as a gesture. Would a letter from the president do? Partridge Family cassettes with a battery-loaded boom box? Perhaps simply being unarmed would be gesture enough.

 Partridge Family cassettes and child's boom box.

Your Friends Will Want To See Pictures

What sort of camera will you bring? What sort of devices for trapping liquids, solids, and artifacts from the year 2195?

Olympus Stylus camera and lots

The Future Might Well Suck Beyond All Belief

If this is the case, perhaps you'll want to crawl into a hidden nook somewhere (surely you can find *one* safe location) and sedate yourself for 14 days until you return to 1995. In this case you might need these:

- syringe and large supply of barbiturates
- ✓ sleeping bag
- ✓ animal repellent
- ✓ Deep Woods Off!
- whatever minimal food and water might stretch over 14 days (Jenny Craig meals?)

Happy packing, future traveler.

Hope to see you two weeks from
now, and hope you have many tales
to tell. Will Ronald Reagan be president again? Will fresh water be a
form of currency? And how many
United Airlines points will it take for
a first-class return trip to the moon?
Only you can tell. Bon voyage.



Me and my dog, Coco.

Dodgeville,WI So this is cyberspace. An environment in which you live and surf and have your being with consummate grace.

For me, it is an intimidating place. Eerie almost. If not preposterous.

Tell you why. Here I am, at the all but over-ripe age of 80, undertaking to help Lands' End Direct Merchants serve you in this latest of all emporiums from which they intend to offer their wares.

Sure, I've been affiliated with them for well over 25 years—ever since the company's founder once worked for me, along with the man who succeeded him as president. The current president was a lad when first I set foot in that original North Chicago basement in which this wonderful company first saw daylight.

But to establish my credibility in this 21st Century environment... it's quite a challenge. And I'll need a lot of help.

Tell you what. You'll find Lands' End has tucked me away in an area to be known as Karl's Corner. (They had the good judgment not to spell corner with a "K," which shows a certain amount of class.) So let me hear from you from time to time. If I'm welcome, you can tell me. If not, I'll walk. (Not exactly "on air," but I'll go quietly.)

For my part, I'll fill you in on lots of little ins and outs of Lands' Endism—
the culture, the principles, the products, the people which have made it a great source of fine values in "cut-and-sewn" products and their accessories.

Deal? The name is Karl Vollmer. Karl with a "K." They tell me Karl's Corner can be found at:

http://www.landsend.com

Meanwhile, I've got to get acquainted with my mouse.

I Can See for Miles! (Rating the futurists)













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John Naisbitt

Alvin and Heidi Toffler Best-selling authors who have

Arthur C. Clarke A 77-year-old science

Herman Kahn

for Dr. Strangelove.

Faith Popcorn

Milestones:

Megatrends (1982), Re-Inventing the Corporation (1985), Global Paradox (1994).

American business consultant.

Future Shock (1970), The Third Wave (1980), War and Anti-war

probably done more to promote

the future than anyone else.

fiction writer based in Sri Lanka.

Childhood's End (1953). 2001: A Space Odyssey (1968), The Hammer of

On Thermonuclear War (1960), The Year 2000 (1967).

The late, 300-pound strate-

gist who served as the model

Planet of the Apes (1968), The Omega

Man (1971), Soylent

Aging actor and NRA

spokesperson.

ever-flowing fountain of quotable statements.

Marketing expert and

Big Idea:

The future holds great promise - in a curiously prosate way. Change will be linear, for the better, and rarely disruptive. The economy will continue improving, and robots will do our dirty work.

We are currently in a period of turbulent change and social upheaval, comparable only to the agricultural revolution of 8000 B.C. and the industrial revolution of the 1700s.

There is something greater than ourselves

God (1993).

The postindustrial future will see unprecedented affluence and permissiveness, thanks to benevolent guidance from our intellectual elite.

Green (1973). Saylent Green is

people.

The Popcorn Report (1991).

Remember the cocoon-

Popcorn's discovery. She

now promotes the idea of burrowing - people

looking for bunkers due

ing trend? That was

Methodology:

"Content analysis" - analyzing how much attention different concerns get from the media over time

Anecdotal, informed by history.

Lots of imagination and firm scientific grounding

Detailed scenarios with supporting numbers, tables, and mathematical formulas.

Be the sole surviving stud of a catastrophe, or the only sentient stud in an ongoing catastrophe.

to increased crime. Watching pop culture trends and sitting around brainstorming

Who Listens:

Large corporations buy his books and distribute to middle management, who then read about how their jobs will soon disappear.

Currently, politicos and Newt Gingrich gadflies.

Kids who grow up to be scientists and engineers.

Policy works and think-tank analysts

Disaster-crazed 1970s filmgoers. Corporate marketers.

with friends.

Politics:

The US representative democracy will be thrown out and replaced by a participatory democracy. This will signal an end to the two-party system, and will result in increased states' rights. As for global politics, "world peace through world trade" pretty much sums up Naisbitt's position.

What we mean by "politics" will change so radically that the Tofflers hesitate even to predict what the shape of national and international politics will look like in the years to come. But you can bet it will be decentralized and more participatory.

Geopolitics is solidly Cold War, with the US and the former USSR racing against each other. China occasionally looms on the horizon, and the United Nations lurks in the shadows

Geopolitics is a matter of armaments for Kahn: Who will have the bomb? Who will have cruise missiles? Still he did foresee formation of regional trade groups like

Studly survivors of assorted apocalypses mate with babes and discover dark secrets about human nature in the movie's final 10 minutes.

Realizing that politics has no bearing on most consumers' lives, Popcorn ignores the issue altogether.

Work:

The postindustrial workers of the future will be Asian, or fluent in Spanish, skilled with computers, and not members of unions. They will enjoy the social interaction of the office so much they won't bother telecommuting.

It will be the era of empowered workers: able to dress as they like and show up when they want. Telecommuting will be the norm, and every employee will also be an entrepreneur.

Clarke's novels rarely discuss anyone who isn't an astronaut. engineer, or diplomat - and unemployment definitely isn't a part of their future.

In Kahn's postindustrial society, the biggest problem facing the middle class is finding ways to spend their increased leisure time. The elites work overtime for the mental thrill of it, and the hippies don't work at all.

Not required in apocalyptic societies. Cars or horses are free for the taking, and many supermarkets are flush with tinned goods.

In a process known as cashing out, many people will quit their corporate jobs and start small businesses, bringing about the economic decentralization of America.

Technology:

Naisbitt's mantra: "The more high technology around us, the more the need for human touch." That's why he doesn't believe teleconferencing will ever take off, or that movie theaters will ever disappear.

Technology forecasting is probably their weakest area. The Tofflers' predictions of everything from paper clothing to space colonies show unrestrained, incessant optimism. Still, they get points for an impressive imagination and for understanding the growing importance of public resistance to new technologies.

Many of Clarke's predictions - from what the moons of Jupiter look like to space navigation techniques - have come true. And don't forget he invented the communications satellite.

He has his share of amusing predictions (like robot maids that clean up the house), but he's also dead-on about others (like fiber optics). What he didn't consider is that social factors would delay - and perhaps block the spread of technologies such as nuclear power.

Bombs and virology have big prospects. Likewise suspiciously green-colored snack crackers.

Whatever consumers want. But foods englneered for health -"foodaceuticals" - look like they will be big.

Worst Flaw:

He thinks the human potential movement (e.g., est, TM) is an important trend.

Can get carried away with their own rhetoric. Every change is revolutionary," "shattering," and "wholly unprecedented."

The future looks a lot like 1950, with white men running the world while the womenfolk fret.

Kahn was blind to the possibility of increased ethnic strife and domestic violence, and decreased nuclear tension.

Heston has trouble meeting friends of his own sex and age.

Annoying tendency to label every idea with a two-word-no-space name: FlashForward, ConsumerSpeak, etc.



The Art of the Long View

by Peter Schwartz (Doubleday, 1991).

This is already the seminal guide to scenario planning. Schwartz gives advice on how to come up with useful and provocative scenarios, provides tips to get your brain running in new directions, and lists some common pitfalls. Real-life examples drive his points home.

Price Waterhouse Technology Forecast (Price Waterhouse).

Every year, Price Waterhouse puts together a detailed analysis of new technologies. This forecast, based on interviews with experts, tries to pinpoint the critical developments within the next three to five years. While copies are not generally available to the public, you may be able to finagle one by calling your local Price Waterhouse office. The company also publishes an edition that focuses on entertainment, media, and communications. (+1 (212) 596 7859.)

There are plenty of experts out there offering predictions about the future. But resources to help you think about the future are less plentiful – and probably more valuable. Here are a few books and magazines that provide the data and methodologies necessary for prognosticating.

- Steve G. Steinberg

Future Survey

Despite being published by the ofteninane World Future Society, this publication is invaluable. Every month it provides a comprehensive list of new books and articles that concern or affect the future. Each item is briefly summarized and classified according to a detailed subject index. (7910 Woodmont Avenue, Suite 450, Bethesda, MD 20814; +1 (301) 656 8274. USS79 per year.)

Predictions

by Theodore Modis (Simon & Schuster, 1992).

Scenarios aren't the only tools available for thinking about the future. This book serves as an introduction to technical forecasting methods such as S-curves and trend forecasting. The author's strong opinions can be offputting, but his insights are wideranging and valuable.

The Structures of Everyday Life: The Limits of the Possible

by Fernand Braudel (Harper and Row, 1985).

Anyone making predictions about the future better have a deep understanding of the events, trends, and beliefs of the past. This book, the first in a trilogy by historian Fernand Braudel, outlines the forces and structures that shape our civilization.

Predicting the Future

edited by Leo Howe and Alan Wain (Cambridge University Press, 1993).

A collection of talks given at Cambridge University, this book offers not only a grab bag of predictions but information about them. Chapters range from Stephen Hawking on the future of the universe to Richard Gombrich on Buddhist prediction to Frank Hahn on forecasting the economy.

Resources



Release 1.0

What Science does for science, Release 1.0 does for technology. This expensive but valuable newsletter routinely analyzes and critiques important technologies long before anyone else is even aware of them. (104 Fifth Avenue, 20th Floor, New York, NY 10011; +1 (212) 924 8800. US\$595 per year.)

Take a pointer from Nathan Myhrvold, Microsoft's "chief technologist": hard-core science magazines

Science

are the best way to stay on top of the future. And *Science* is probably the best of the bunch. While not always easy to understand, it offers rewarding glimpses of what might be. (1333 H Street, NW, Room 1167, Washington, DC 20005; +1 (202) 326 6417.

The New Century: Quest for the High Road

by Clem Sunter (Human & Rousseau: Tafelberg, 1992).

This is a wonderful example of what a detailed set of fleshed-out scenarios looks like – and the impact it can have. The book outlines several possible futures for South Africa, then discusses what it would take to get there and what the results would be. These scenarios helped shape de Klerk-era South African political discourse.

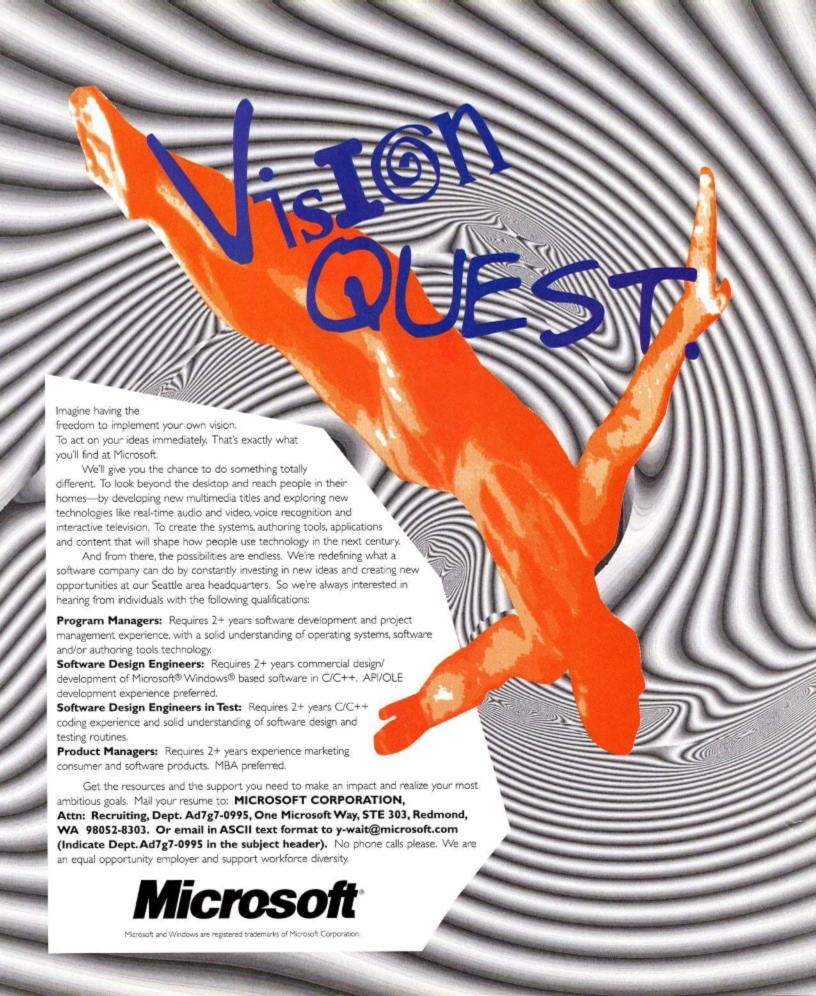
Any pulp science fiction

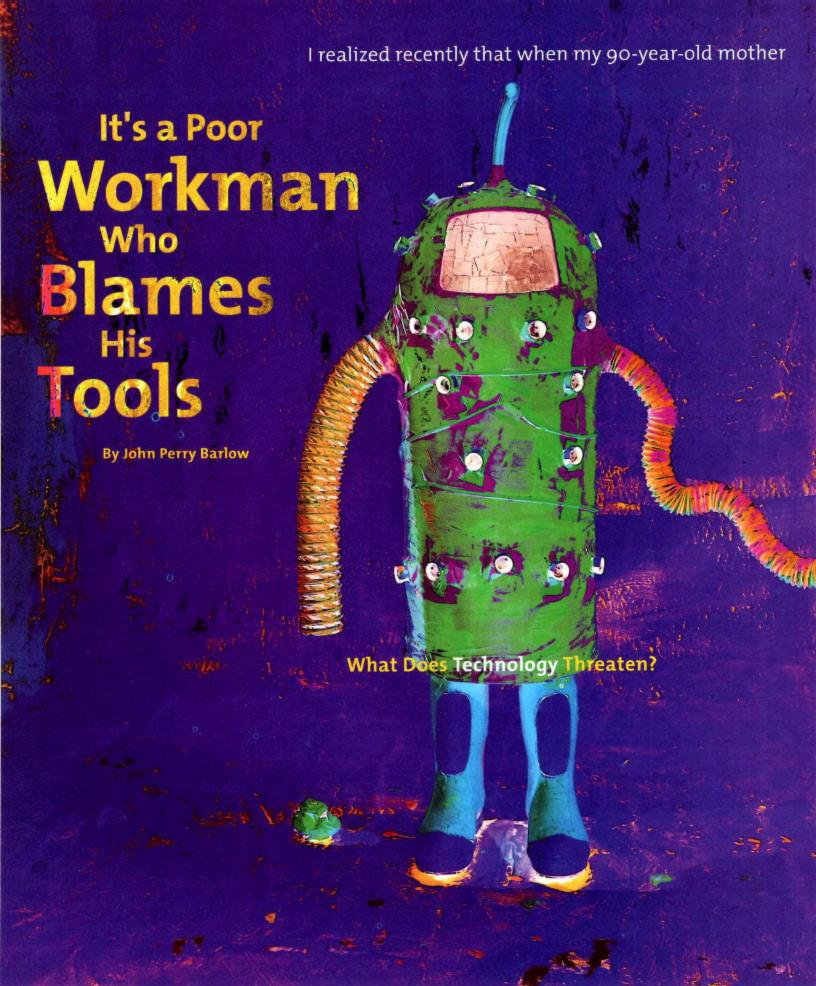
if you want to know how technology is going to look in 20 years, says futurist Paul Saffo of the Institute for the Future, take a look at current pulp science fiction novels. These are the books that the scientists and engineers of tomorrow are reading. To see the impact of sci-fi, look at how Buck Rogers novels of the 1950s shaped the space program of the 1970s.

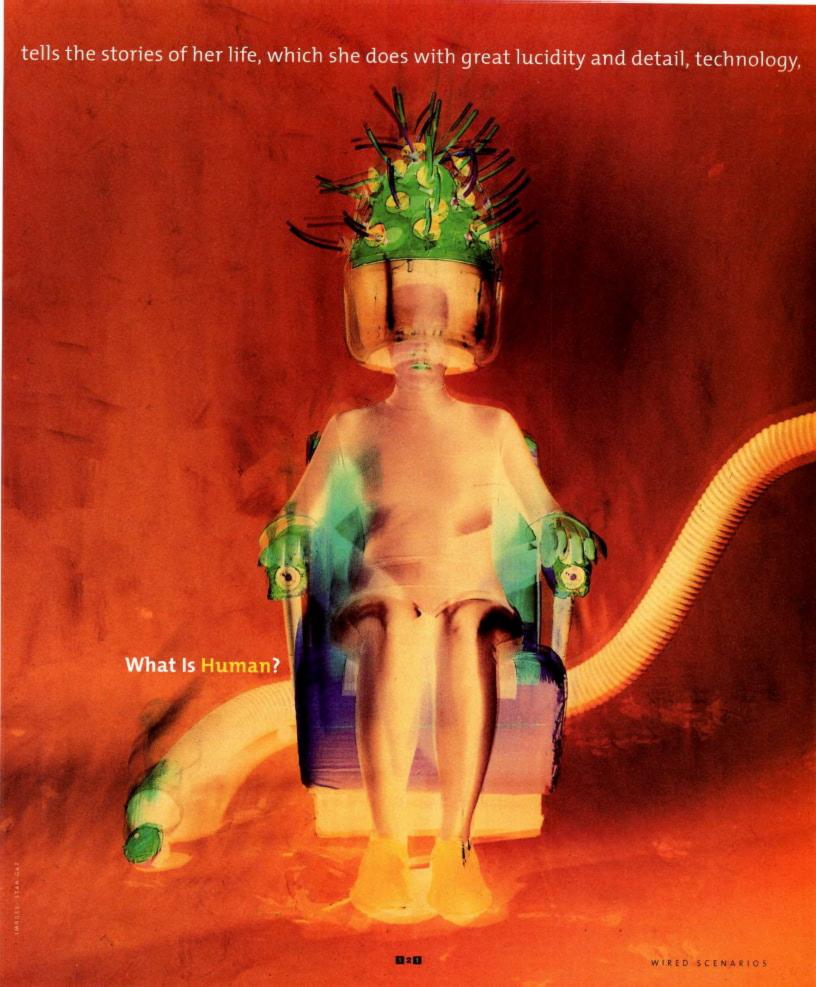
IEEE Spectrum

This magazine is worth reading for an engineering (as opposed to a business) perspective on new technology. The articles are usually crisp and well illustrated, and they always include references to the relevant technical papers. (445 Hoes Lane, PO Box 1331, Piscataway, NJ 08855-1331; +1 (800) 701 4333. US\$157 per year.)

US\$97 per year.)







or the lack of it, is almost never a factor in them. When she talks about the important events of her childhood in pioneer Wyoming, there is little to indicate that they took place in a world where there was neither electricity nor phone service, where the only motorized vehicles were the steam locomotives that never came closer than 100 miles to her log house.

It was a world made entirely of atoms. Claude Shannon had yet to invent the bit. The closest thing they had to mass communications was the Pinedale Roundup, which propagated information even more languidly than did the gossip net, though the latter was restricted to the bandwidth of a galloping horseman. Heaven was the only virtual reality. Interactivity required biological entities on both sides. Despite all that space, there was no privacy at all, and the most socially transforming new technology was barbed wire.

John Perry Barlow (barlow@eff.org) is a retired cattle rancher, a lyricist for The Grateful Dead, and co-founder and vice-chair of the Electronic Frontier Foundation.

It was a very different world than this, but to hear my mother talk about the adventures and misdemeanors of its inhabitants, there is little to indicate that. What is more interesting to me is that in her stories about more recent times, technology doesn't come to play a particularly visible role. It remains de-emphasized after a feverish century that has frothed with the greatest explosion of tools in the history of humanity. Surely human beings equipped with all the leverage, extension, and amplification with which the world has been endowed by the 20th century are very different creatures than the Victorian cowfolks who raised Mim Barlow. But



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not to hear her tell it.

This is because her stories are about people, as good stories always have been and possibly always will be. Whether they star "Bearface" Dodge, who choked an attacking bear with his fist, or cattle baron Great Uncle Amos and his opera "students" put up at the Hotel Utah, her stories are about the semi-eternal dance that is Life Among the Humans. Whatever the medium, the venue for that dance is less important than the music. Marshall McLuhan notwithstanding, it's the conversation, not the phone, that counts to my mother.

I mention the techno-free zone of my mother's memories because I find myself making a lot of bold claims these days about the unprecedented changes that the bit and its Net will wreak upon humanity.

We are swiftly creating a world as much of bits as my mother's was of atoms. A world in which everywhere is everywhere (and nowhere) all the time, one where the self disappears toward each horizon. On one end, it fragments into the lesser selves, liberated from the body, whose consensus in committee has created it all along. On the other hand, it coalesces into a greater self, as every synapse on planet Earth strives toward becoming continuously and continually connected to every other synapse in a vast ecosystem of mind, a mind within which the boundaries of the individual might blur to the point of eradication.

Maybe. But if technological change of the magnitude my mother has seen in her 90 years is too unimportant to make the cut into her stories, I'm wondering just how different



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the outside has to get before the inside starts to disappear.

At what point do the characters of Shakespeare or Chaucer become unrecognizable to what technology has made of "us"? Or we to the likes of them?

This is the issue with technology, of course. As a species, we are beginning to feel technology as a threat not so much to our literal survival – though certainly it's that at times – but to our *identity*. We perceive virtualization as a threat to those characteristics, less of flesh than spirit, which combine to produce "humanity." We worry, perhaps advisedly, that it imperils those characteristics that are the real actors in both my mother's and Shakespeare's dramas.

Just as bushmen fear soul-stealing cameras, we suspect that technology is sucking the humanity out of us. There are those who say it's time to put the brakes on this blindly accelerating juggernaut of change before we're sucked dry. Most of the loudest detractors are old hippies like myself who are actually pretty comfortable with tools developed before they were 25, but who have otherwise become as obdurately suspicious of the new as the crankiest of their dads. (God, how I love irony.) They are convinced that it's time to do something.

Based in part on my mother's stories, I'm more inclined than my anxious contemporaries to think that humanity is a technologically resistant quality, but I agree with them that big, potentially unpleasant changes are afoot. And since I, along with my contemporaries, cherish the Human Phenomenon – even if I don't share their sense of its peril – I agree

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that it's appropriate, if a bit academic, to ask some questions.

What are the essential ingredients of humanity? What is technology? How do the two relate, and what, if anything, can we do about any of it? At the outset, the lines inside these questions are more blurry for me than they are for the Neo-Luddites, since in addition to threatening our humanity, technology, I think, is probably humanity's most essential ingredient. What sets us apart is an itch, a permanent, hard-wired, unscratchable irritation with the general state of things. We are alone among species in being so dissatisfied with the universe nature gave us that we have created tools to fix it.

We should have called ourselves Homo dissatisfactens. From Homo habilis (Tool-Making Man) to The Sharper Image, we have been trying – unsuccessfully, it appears – to make ourselves comfortable for the last 350,000 years or so. Only a tribe of aborigines in Australia was hip enough to notice that the more one has, the shorter it feels. So they got off the treadmill when their tool count had risen to a total of five (counting the digeridoo).

Any time you've got a process where more feels like less, you've got a positive feedback loop hung in the "full-on" position. And this describes what I see happening in the areas of technology that I think are most transformative: bandwidth increase, Internet growth, processor speed, digital storage capacity, and even human nervous tissue.

With the exception of the last, which is nevertheless increasing its total mass at an astonishing rate, all of these are growing more



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or less exponentially, doubling over short periods, fueling one another, sharpening their plotted trajectories toward the perfectly vertical. Headed God knows where and taking us with them. Real fast.

behind, perhaps not our humanity, but certainly many of the human institutions and stable power relationships from which we derived some security during the Age of Reason (now apparently ending). I don't think there will be a federal-level government left on Earth in 50 years. We might be governed, to the extent we are governed at all, by mayors the size of emperors, tribal chieftains, mob bosses, and general adhocracy all around.

Yow. Maybe these old poops are right. Maybe we'd better stop this thing before it's too late. OK. How do we do that? Who's got control of that big kill switch? Who the hell's in charge here, anyway?

The Neo-Luddites know. They finger the usual suspects: the gray men who run the multinationals, the national security state, the cruel yoke of consumer exploitation. These plutocratic parasites could halt the leviathan of technology any time they wanted to. But, of course, they won't because they get rich from it. And, they care more about money than humanity.

Unfortunately – or fortunately – it's not that simple.

Close examination reveals the perpetrators are, in fact, the usual (though rarely suspected) culprits: ourselves. It's us and our itch. It's that little problem over in the corner that we could surely

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The Luddites lost. Their successors will too. If I didn't believe that wholeheartedly, I might be tempted to join.

But I think we are plunging down a river that has no banks to rest on. Returning upstream to some bucolic 19th-century paradise of honest toil and values is not an option. Believe me, I've tried. You row hard to stay in place, and eventually you go broke there. It's downstream, like it or not.

But like any white-water rafter, we have some other choices, rocks to avoid, cataracts to circumnavigate. What are the shoals in this stream and how can they be avoided? Which brings me back to my initial question: what are the essential properties of humanity, how does technology threaten them, and what is our range of potential response?

the central characters in my mother's tales – are semiindependent creatures that inhabit the human spirit. They are virtues like faith, hope, and charity. They are also the Seven Deadly Sins. And they are all the oft-repeated loops of human glory and folly that are negotiations between those two communities of behavior.

But if you look for the native home of these abstractions, virtuous or sinful, you find they don't live solely inside individuals' Put a fork in it.

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heads. They live in the spaces between people's heads. They dance in the field of interaction. As with technology, they live inside us and we live inside them. The human virtues are about connection – achieving it, sustaining it, believing in it – while the sins, as Nietzsche held, are about separation. Human sins are creatures whose behavior amplifies the separateness of the flesh until they create a separateness of the soul.

I find it hard to believe that the current explosion of digital technology, which seems to be about connecting everything to everything else, will do anything but pump energy into the space where the virtues live. Given new tissue of glass and electricity to bridge the danger zone between bodies, the old deserts of physical separateness may fill with a psychic rain forest of global interaction.

Or not. Surely this is the dream many once harbored for television, that it would unite humanity into a sense of its greater self. It's easy to forget that some of that dream came true, since, more potently, television became something that separated us from one another, a place where 60 million people could laugh at the same joke and yet remain entirely alone. It also became an extremely fecund habitat for pride, greed, lust, envy, gluttony, anger, and that other one I can never remember (but of which I must be especially guilty).

Yet, the essence of an engaging story remains the same even in the distorted hugeness of televisionland: "Did he kill her? Why? What does this incident tell us about ourselves? Do we

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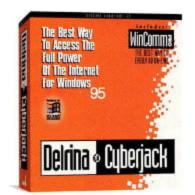
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harbor such impulses? Should we show him mercy or vengeance?" We sit on our sofas watching the new thing, thinking about all the old things.

But in my way of looking at it, the very process of thinking about the old things is more like listening in on the conversations taking place within the committee of our lesser selves – from which the somewhat arbitrary local "Self," the Self within the body, is assembled. (I don't believe that Multiple Personality Disorder is a disorder at all, but rather the common, yet generally ignored, state of things.)

The little selves that comprise this inner mob may have many sources and forms. They may be echoes from earlier evolutionary layers; inner reptiles can often be observed operating human bodies, for example. They may be faint replicas of the people who raised and nurtured us, unexplainable hormonal weather patterns, loops of pure habit, or, for all I know, bits and pieces of partially reincarnated souls. There is a lot of room in the human personality, but it can seem a crowded house nonetheless.

Above the meat self, it's crowded as well. Even without believing in some Teilhardian Overself, there are many human-based collective organisms within whose interactions human properties may dwell: the family, the corporation, one's culture, one's religion.

In cyberspace, the range of self broadens and becomes more diffuse, sliding up and down the scale between lesser selves and the greater Self as it is gradually liberated from the body. The question is whether this diffusion threatens the

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environment of human properties. And, of course, whether the greater Self becomes greater. Will we lose ourselves to these processes? I don't think so.

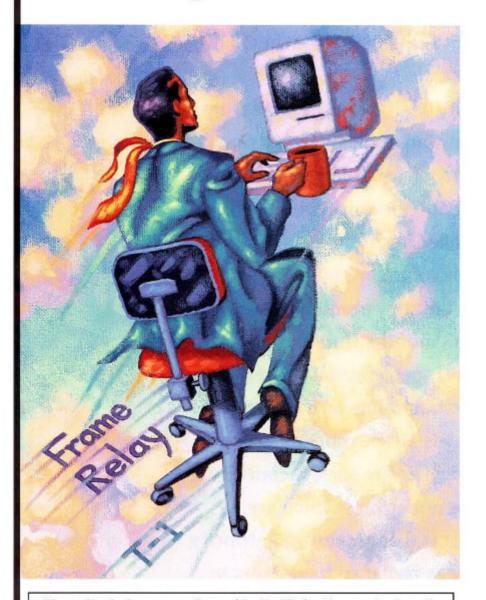
We should take a look at evolution to inform our thinking here. Life forgets nothing, discards little. At the base of our genetic code is blue-green slime genetic code. We ascend upon depositions of layered complexity through cellular collectivization into vertebrate forms and finally into the anxious, itching consciousness which now appears compelled to create new, overarching forms of a more global consciousness to layer above itself.

Just as the blue-green slime code remains intact at its rudimentary level in the Great Chain of Being, so the old properties as manifested by individual humans will probably survive, largely unmolested, their incorporation into the new whole mind now being born above them, Humanity Itself.

I think of the self, as we understand it, like mitochondria. Mitochondria are freestanding creatures from the primordial goo that gradually became enveloped into the physical structure of multicelled animals. Inside our cells, and still somewhat separate from us genetically, the mitochondria go on about their affairs rather as they did all along, though in doing so, they become like mercenaries in the service of our immune systems. They are part of us and we are part of them, interpenetrating interdependency. From the mitochondria's viewpoint, what have they lost by being subsumed? Not that much.

I suspect the mitochondria in me are little aware of the higher order

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Official Access Provider to The Microsoft Network 3060 Williams Drive Fairfax, VA 22031-4648 info@uu.net http://www.uu.net processes that make it possible for "me" to think and type these words. They're concerned only with the continued vitality of the ecosystem where they live, my body. By the same token, the layer of consciousness – the me – which is entertaining these thoughts, thinking of "myself" at this moment sitting on a beach in Australia, is little aware of the gradually forming thoughts of Humanity Itself. It is concerned primarily with the continued vitality of the ecosystem where I live, my planet. And, of course, lunch.

It may be that Humanity Itself isn't a new creature. Perhaps It has been up and running and thinking Its own great thoughts, unintelligible to us, for as long as we have been thinking ours. Perhaps what Humanity Itself thinks is one especially great thought called Technology.

Let's consider one technological manifestation,
Moore's Law, which has been accurately predicting the doubling of processor speed every 18 months since being propounded in 1965. A plot of CPU speed increases over this period, making an unnaturally straight line on a log chart, a line whose undeviating linearity is all the more odd considering that the collected efforts of an entire society contribute to each new doubling. They are not efforts which are, or could be, coordinated by any central engineering authority, and yet they proceed as orderly as proletarian workers in Socialist Realist sculpture. To me, the process described by Moore's Law feels like the mental product of a greater Self.

However the work is guided, it seems clear that we are wiring a better nervous system for Humanity Itself. I don't believe it



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Which is to connect. To make contact. To wake up, shocked by the voltage of increased interaction between the properties of humanity in my heart and those in yours.

To be whole.

Here is the primary choice we're given as we tumble over the falls into the future. When we behold some new species of technology, we should ask ourselves one question: does it connect or does it separate? And since every powerful technology will probably do a lot of both, we should ask which of these properties is naturally dominant. For example, the telephone both connects and separates, but you can argue persuasively that it more often than not connects. Television both connects and separates, but a close look at America reveals the wreckage of its savage predisposition to separate.

There is another choice as well. As we get older and history mows down our old familiarities and replaces them with phenomena whose virtues and sins we can't immediately discern, we can choose how to greet uncertainty. We can slip into bitterness and resistance, or we can take solace in the fact that, however progress may re-costume the players in the tale, the story, the source, and the repository of my mother's stories and those of a billion other mothers have yet to change much. Maybe they won't.



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Global Neighborhood Watch

◆ 100 The question, of course, is where to send the video.

Well, we West Coasters are eight hours behind the UK, which is eight hours behind Australia, which, in turn, is eight hours behind us. So when it's prime crime time in any of those places, it's late morning or early evening in the others. People are wide awake, and, if they are wired types, they are near their computers.

The plan is to find neighborhoods in the UK and Australia that also have high nocturnal property-crime problems, and that are also inhabited by computer users. They'll set up cameras in their trouble spots and patch them into the Net, too.

Imagine that I'm sitting in front of my PowerBook one morning, writing fiction or balancing my checkbook. Suddenly a window pops open on my screen, showing me live video from Australia. At the bottom of this window are two buttons: one green, one red. If the culprit is a stray dog or a tree blowing in the wind, I hit the green button, and the window is dismissed. But if it's some son of a bitch breaking into a car, or vandalizing a building, I hit the red button, and in Australia a rude noise blares out of someone's computer and wakes him up. Or perhaps he's already been alerted by another participant in the UK. The Aussie goes to the window, verifies that a crime is in progress, and summons the cops.

Or perhaps he emerges from his house and tells the bad guys to knock it off - then they threaten to trounce him.

Windows are the best crime-prevention devices of all, if you only bother to look out of them. The virtual windows on a computer screen could serve the same function, linking distant places into a distributed neighborhood. In modern society, we have more in common with fellow homeowners on the other side of the planet than we do with burglars living a few blocks away. Until outlaws started threatening us, we've politely ignored this fact.

Readers in the UK or Australia (or other countries in roughly the same time zones) who think they are candidates for our prototype Global Neighborhood Watch should e-mail me at neal@well.com. We are seeking neighborhoods where there is a nagging property-crime problem, where people know each other, and where several households own Windows or Mac computers.

We're hoping for a friendly and cooperative little distributed neighborhood. But the US is so large, computerized, and crimeridden that Global Neighborhood Watch will probably be a seller's market in the long run. Companies will establish giant airconditioned warehouses in Malaysia where workers sit in front of screens keeping an eye on untold anonymous minivans. What visions of America will these workers develop in the long run? When they watch Starsky and Hutch reruns, all they see is crime, crime, crime. When they patch in to Global Neighborhood Watch, they'll see stray dogs, blowing branches, paper carriers, and - every so often - crime. That's an improvement, but it's so boring that they'll have to be paid to watch it. If we could develop image-processing and pattern-recognition software good enough to filter out dogs and tree branches, then it would be crime, crime, crime again, and maybe they'd watch it for free. We cut out the Hollywood middleman. The solution to our crime problem becomes their entertainment. Everyone wins, except the criminals. Which is how it's supposed to work. . .

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■ 88 That was the lowest moment?

Absolutely. I remember we all got very drunk after the meeting, and Jimmy Steinglass, before he passed out, said something that eventually changed everything. He said, "Well, Amy, we humans had a good run, but we lost. Our immune systems just aren't up to Mao. Call up Evolutions 'R' Us and order me a new one." And that was it. That was the start of the Castillo-Steinglass Immuno-Augmentation, you mean? You decided that you actually could redesign the human immune system?

Yeah, we were crazy. Of course, I was a virologist, and I had no business thinking of something like that. Both Anderson and Maurier went ballistic when I suggested it, but we hammered it out, and gradually they saw it was a logical approach. Because we had the genome, you see. We could design not just micro-organisms, but parts of human beings. We met for nearly 24 hours straight, in what we called the Playroom, a virtual environment that Javier and his people cooked up. Basically, you float, or you seem to be floating, in a big tank with all the other people, and you can run simulations. A virus particle looks about the size of a filing cabinet, and a macrophage is about the size of a dump truck. All the other kinds of relevant cells are to scale. You can actually watch a Mao particle invade a T-cell and subvert it, watch the reverse transcriptase

Our immune systems aren't up to Mao. Call up Evolutions 'R' Us and order me a new one.

unwind the human DNA. And, of course, you have these "wands" in your "hand." You can just touch a base pair, for instance, and get as much data as anyone on the Net.

So there was an increase in the actual speed at which you were able to work on the virus?

Oh, my, yes! Two, three orders of magnitude. We didn't have to do experiments in animals and wait and wait. We had the human genome nailed, and we had the Mao genome nailed. And we had that marvelous system for communicating among scientific minds. We used that system to design a new human killer T-cell – the Mao Killer T. And, of course, we had to armor the MKT cells against subversion.

How did you do that?

Actually, it wasn't me; that was Javier's idea.

But I thought Javier was a graphic designer, not a scientist.

Which is probably why he cracked it, and we didn't. He worked out the simulation routines that showed how Mao did the cell intrusion and subversion. And he became fascinated with membrane geometry, not knowing anything about protein electrochemistry or synthesis. For him it was just a graphics puzzle, and he played around with the simulations until he found a surface that would turn the probe back on itself. All we'd asked him to do was modify the program to suppress the subversion display. We thought, you know, he would just create a simple command. Instead, he solved the problem of armoring, because if you can simulate it, you can

order it up in wetware. When we saw the demo, the Playroom went silent. Absolute silence for perhaps 30 seconds. Then everyone starting talking frantically.

Was this the first time that you really noticed your future husband?

Hardly, Granted, our concentration was on the Mao virus, and we had very little of what you'd call personal time. We were also young and relatively healthy. We had access to medical and contraceptive devices. Within the enclaves, we were hardly monks. My problem a common one at the time - was that I was attracted to someone living outside of my Hygienic Alliance, the West Coast of the US being off-limits to Canadians. So, we used the Net as much as we could. Javier would send me little, I guess you could call them "cards," funny animations, kind of visual love poems. And, of course, we had touch simulation in the Playroom programs, and even had access to some digital sex devices. We were able to make love, after a fashion, that way. Our wedding was one of the first things that happened in the Playroom. Everyone needed a positive act like that. It was a chance to celebrate. I remember someone quoted the poet Charles Bukowski. Something about how sex is our way of kicking death in the ass.

And after the wedding you decided to have children, even though you couldn't have any physical contact with your husband. Was it by artificial insemination? Somehow you got his sperm....

Oh, God, no! There was no way for us to bring biological specimens across alliance lines. Like the rest of our marriage up to that point, we did it over the Net, so to speak.

It's all information, dear. Javier had Margorie Leblanc digitize a

You've lost me.

haploid genome from one of his sperm cells, and he uploaded it. I downloaded it into a sequencer and converted it into a DNA strand. One of our local team members graciously volunteered a sample of his own sperm. We cut his DNA out, spliced in Javier's, and did a standard in vitro fertilization with my eggs. The implant took, and that was Imogene. Two years later, we did it to have our son, Larry. Okay, closing out the Mao story now, I want to ask you, once you had the immuno-augmentation, how did you deliver it? This might be the most frustrating part of all those years of work. I often tell people that while human life is finite, politics are endless. Here we were with an answer to Mao, and we couldn't get it to millions of people - Central Africa, much of the Middle East, even the rural US. The fear of outsiders was so ingrained in people at that point that the suspicion and resentment of alliances from the developed world overpowered everything else. Power, at that time, was in local hands. Central governments were bookkeepers. We had to establish ties into regions, states, and individual villages, all across the world. The task was as monumental as cracking the virus itself. But we did it. Slowly. Some regions would appear clean tropical Brazil for example - but there would be an outbreak in six months, so we'd have to go back, and then go back again. Each time, the outbreaks were smaller. Eventually, two years later, we had the upper hand. I'm happy to say that our immuno-augmentation vaccine was the first product after the Plague to cross every border in every hygiene zone around the world. And we donated the vaccine formula to Doctors Without Borders, so it will remain in the public domain. No one's getting rich off this Plaque.



The New World Disorder

◄ 105 the world was coming to an end. The domination had begun in the 15th century with the great wave of exploration, and it was consolidated by colonialism and the power of the industrial revolution. Nearly every part of the world had been dominated by European values, culture, institutions, and languages. But as Asia came to achieve economic equality in the first decade of the 21st century, followed by political equality, its values, culture, and languages began to rival those of Europe in global impact. Europe did not disappear from the stage, but its reign as the dominant cultural power was over. Lee Kuan Yew, the late prime minister of Singapore, made it clear that Asia's continuing success could not come from emulating the West. It would rise or fall on the basis of its own history and culture. The vita of the world was no longer Western history.

Perhaps no Western country reflected this decline in stature as much as the increasingly insular and marginal United States. At the turn of the century, the Republican Party's extreme right wing successfully forced a de facto withdrawal of the US from the United Nations. There was no US ambassador to the UN nor any dues paid after the year 2000, even though the UN continued to meet in New York. Indeed, US participation in many international bodies withered at the turn of the century. The US no longer participated in the World Bank, the World Trade Organization, the International Telecommunication Union, or the Organization of American States. All were seen as either a threat to American sovereignty or a waste of money. Failure to participate in negotiations about the regulation of service industries in 1995 led to the gradual exclusion of the US from the business of wiring the world. Nearly everyone outside of Africa was on the Net by 2010, via satellite or wire. But unfortunately, a technology that had begun in the states ended up benefiting few US companies. Emerging software standards were negotiated in international arenas that the United States avoided, leaving US companies in the dark.

The US, however, was eventually forced to participate in international events for a familiar reason: oil prices. OPEC was long gone from the scene, and the Persian Gulf oil producers (led by the Islamic nationalists in power in Saudi Arabia, Iraq, and Iran) had been unsuccessful in their occasional attempts to raise oil prices. New oil fields in Russia and central Asia kept adding to the world's oil supply, keeping oil prices down. But all that changed on January 30, 2013, when an anonymous foe detonated a small nuclear weapon in the middle of the huge Tergiz oil fields on the shores of the Caspian Sea in Kazakhstan. Suddenly, the world's oil picture was of interest again, as prices headed for the long-expected US\$100 per barrel.

In response, the US president initiated strict oil rationing and began to weigh the possibility of military intervention in central Asia to protect remaining oil supplies. There now appeared no way the US could avoid the war building in central Asia, where all the sources of conflict were coming together in a deadly brew. The problem was that in a world in which the US felt no sense of shared interest with any other nation, it couldn't decide who its enemies were, nor who its allies were.

Of course, US President Christy Whitman was not alone. Every world leader was in a similar position of confusion as the world fragmented around them.

Colophon

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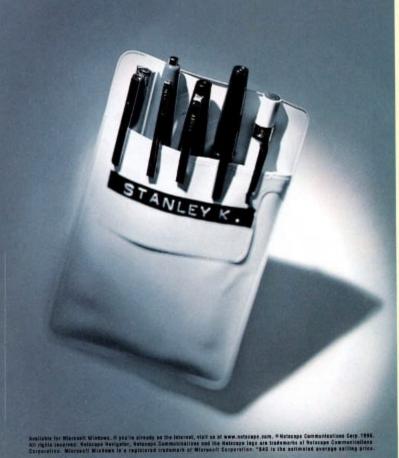
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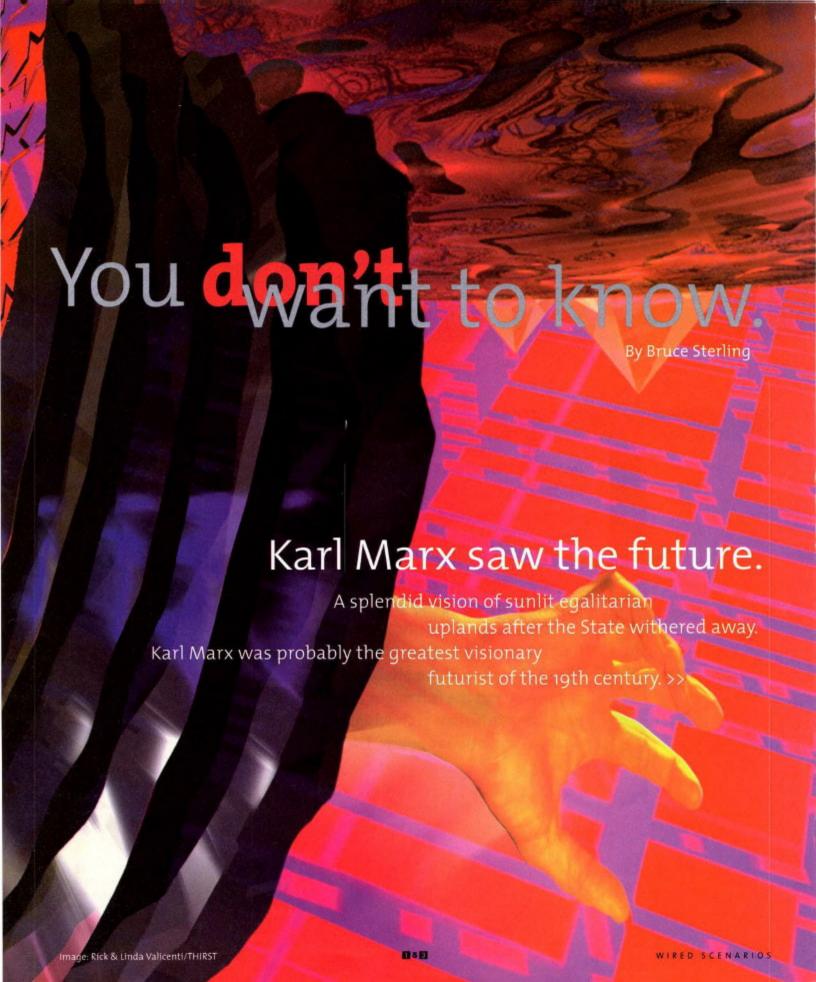
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Pivot easily to landscape mode and you're set for spreadsheets, desktop video and other horizontal applications.

Either way, the spacious 9.6" x 12.9" active display area gives you plenty of room for icons, launch bars and other graphical tools of Windows 95. Plus

our sharp, crisp image and resolutions up to 1280 x 1024 make everything easy to look at.

The Pivot 1700 works with popular Windows graphics cards and standard Macintosh video. It also works with your budget—it's yours for what you'd expect to pay for a landscape-only model from Sony, NEC or Apple."

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When the Japanese face the future, they prefer a coherent intellectual grip.

An island nation like Great Britain might accidentally blunder into an industrial revolution

or even a global empire, but that kind of organic untidiness doesn't suit Japan.

Scrap the lawyers:

They don't produce – all they do is mediate between grumpy loners. Put engineers – those hardheaded can-do rationalists who understand spreadsheets and flow charts – in charge. Pour power and authority into the industrial ministries. Build enormously detailed demographic databases:

people in Japan love filling out consumer

forms because it makes them feel loved

and needed.

Manage global markets with improved information.

Offer better customer support across the Pacific than

Americans ever bothered to do in their own country.

the future:

Manage

Create MITI, Japan Inc.'s corporate futurist colossus. Find the seeds of new tech-

nologies, then match them with the needs of growing industries. Knit government and industry into a seamless web of transferable expert managers. The result:

those estate values kyrocket

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☼ 1995 Electric Image, Inc. Character ™&© Electric Image, Inc. ElectricImage, Renderama and Satisfy Your Creative Addiction are trademarks of Electric Image, Inc. Specifications subject to change without notice. Vannevar Bush was a classic American futurist.

He was an electrical engineer, not a politician,

he told politicians what to do and they believed him.

Bush ran the Office of Scientific Research and Development during World War II, turning

head-scratching Yankee academics

into the world's first organized and coherent military-industrial complex. He pushed the Manhattan Project. He founded the National Science Foundation and provided not only its intellectual underpinnings but also its political rationale. Bush even foresaw the personal computer – or, rather, the "memex," the personal hypertext databank.

Vannevar Bush probably had more influence on the growth of 20th-century science and engineering than any other single human being.

Come 1995, and Vannevar Bush is profoundly out of intellectual fashion. The enormous bigscience Rocket State superstructure that grew from his vision is under unprecedented political and economic attack. If Bush showed up in the current Congress, **he'd be despised as a goofy liberal highbrow**. Congress's Office of Technology Assessment was the nation's premier futurist agency. It was abolished by Congress this July. When

Congress deliberately closes its eyes

you can bet it

won't have a lot of time and energy for anybody else's visions.



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so entirely out of fashion that it's considered physically impossible.

The easiest and cheapest way to restrict an overactive government is to blind it.

Don't want to hear a bunch of Cassandras reabout potential reefs and breakers for the state of the place of the "butterfly effect". Don't want to hear a bunch of Cassandras moaning about potential reefs and breakers for the Ship of State?

Chaos is the sexiest excuse

for laziness ever invented

Everybody's heard of the "butterfly effect" by now.

The weather is the very paradigm for chaos: unpredictable, totally unmanageable, globally distributed, out of control. So why worry about doubling the carbon dioxide in our atmosphere in fact, why even keep records? If scientists at the National Oceanic and Atmospheric Administration proved beyond sane doubt that we were destroying the planet, we might feel obliged to try to do something. Why risk that possibility?



Start having fun on Windows® 95 with Pitfall: The Mayan Adventure — 13 thrilling levels, fantastic side-scrolling gameplay, stunning animation and a truly incredible soundtrack.

Because the best reason to upgrade to Windows® 95 is...playing!



It's sheer panic above the crocodile pits!



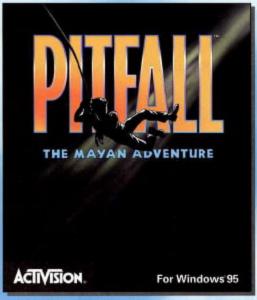
The original PITFALL! - Hidden in the game!



Beware the slicing claws of the Jaguar Man!



Grab a vine but don't look down!



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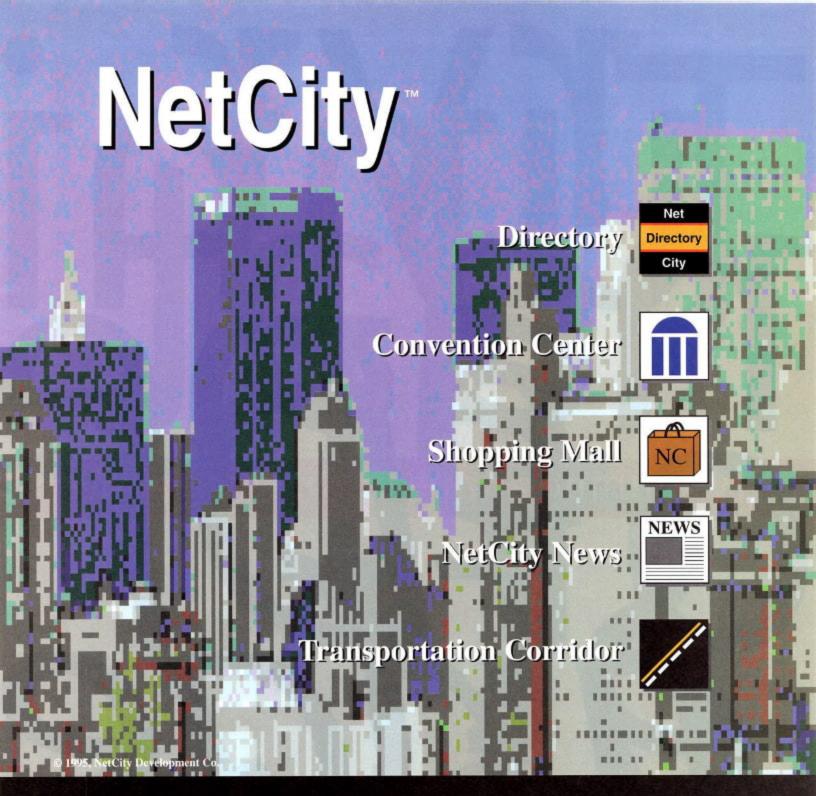
we're out of will, money, energy & ideas.

There's no market-pull for the health of the ozone layer. It's

a time perleasing edss.

There is such a thing as "alternative" futurism, but it has a far worse record of accomplishment and insight than Vannevar Bush did. The energy crisis is history. Synthetic fuels got nowhere. Fuller domes are uninhabitable. We're not running out of key mineral resources.





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Ever notice how the terrifying bogey of the Arms Race has simply

Value of the cultural radar?

It slunk off with the same embarrassed reticence

as its big, shiny futuristic cousin, the Space Race.

people want to live for The biggest political idea on the planet in 1995, the vision that and die for, the vision they truly believe in their heart of hearts, is reactionary Islam.

The End of History -

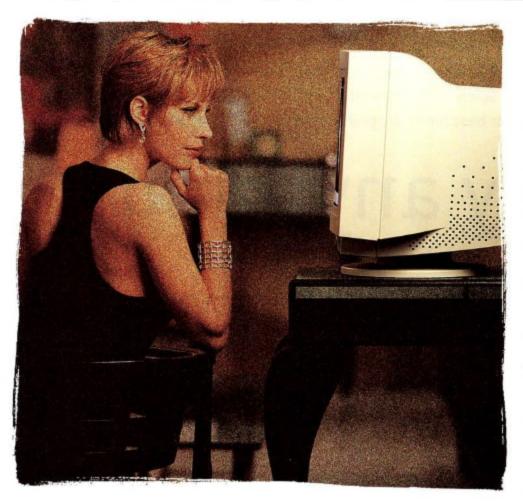
a code term for the across-the-board annihilation of progressive social visions — is at hand.

We flatter ourselves when we think we're putting an end to history.

The end of the world and the **death** of the future are always popular

across the spectrum. James Watt left power, but lo! there was no Rapture. Just our national forests looking a tad more dusty, battered, and acidic. >>

EUROPEAN ART COMES TO THE SCREEN, WITHOUT THOSE ANNOYING SUBTITLES.



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it makes those little

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subtitles so much easier to read.

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what is there left to say or do

about it? We're all hip to nonlinearity now – anyone with two brain cells knows that the future is unpredictable, even in principle. Science fiction writers still like to jabber about it, and they are more reckless than a lot of other basement prophets because they have so very little to lose.

Why say anything?

The crystal ball's as cracked and clouded as the ozone layer.

Who are we kidding?

Why bother to gaze into the future?

In 50 years the world changes completely – but everyone who could notice and comment is shellshocked or dead.

These things aren't a joke. Here's why: ➤ Those who don't know the past will repeat it. ➤ A vision of absolute power is absolutely corrupting of vision.

If the facts seem to fail you, try historical analogy. What the heck, at least it's vivid. ➤ Practically anything beats depending on Scripture. ➤ Demographics really count. All the people who are going to run the world in 20 years are alive right now. ➤ The future is always overplayed in five years.

This is known as hype.

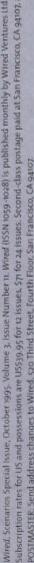
This is known as "history."

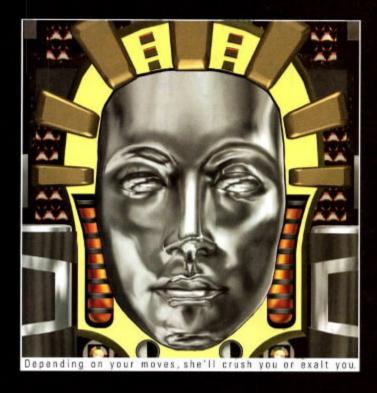
If the topsoil goes, it all goes.

The classic Mayan civilization (now long extinct)

had a superbly pampered class of brilliant astrological futurists.

When in doubt, wear more feathers, eat more peyote, and pierce your tongue.





All your twisted dreams of power. Granted.

All your schizo-paranoiac fantasies. Free rein.

All your enemies, and all their enemies, and so on and so on and so on. Broken.

All your damp, dark, chaotic longings to control the universe.

Be careful what you wish for.

Hita The Voll

The first net-capable, intergalactic, PC CD-RUM game of ultimate strategy.





If the future were really predictable, we'd all hang ourselves right after killing our children.

always sells.

It sells like lipstick.

Because it flatters our vanity.

When H. G. Wells was dying, he somberly predicted the imminent collapse of all human civilization.

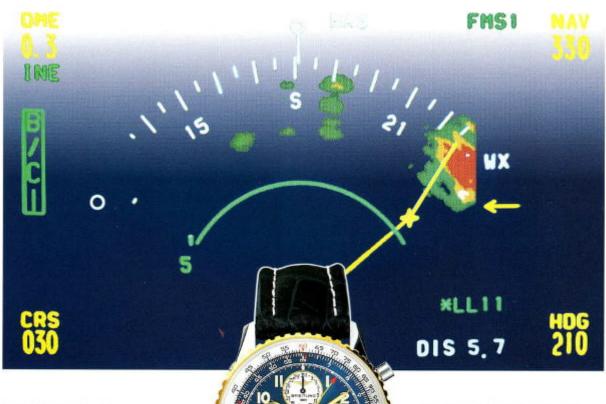
Real futurism means staring directly into your own grave and accepting the slow but thorough obliteration of everyone and everything you know and love.

Does this sound like fun

It can be.

Just don't expect it to move a lot of product.





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